HILL LIBRARY
ST. PAUL
NOV 29 1946
RECEIVED

the OIL AND GAS JOURNAL

Not an Ordinary Emulsion Treater...

But a Distinct Improvement

OVER WHAT THE OIL INDUSTRY HAS BEEN USING

Greater treating capacity and lower shrinkage loss are shown by actual tests on the new Maloney-Crawford Improved Design emulsion treater—resulting in low operating cost. Investigate the features listed below. Call a Maloney-Crawford representative for detail specifications.

STAR FEATURES

★ Long Travel Tray Section
★ High Capacity Free Water Knockout
★ Oversize Gas Separator
★ Adjustable Outside Water Siphon
★ Improved Outside Heat Exchanger
★ Gravity Conservation
★ High Capacity Removable Furnace
★ Eliminated Necessity of Filter Section
★ Easier Inspection and Cleaning
★ Safety Approved Ladder and Guard Rails
★ Quieter Settling Section

Maloney-Crawford Type M Emulsion Treater

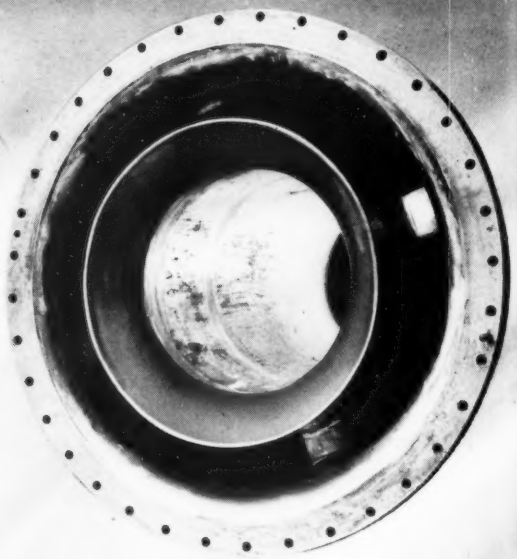
Stocks and Service Available in Principal Oil Centers

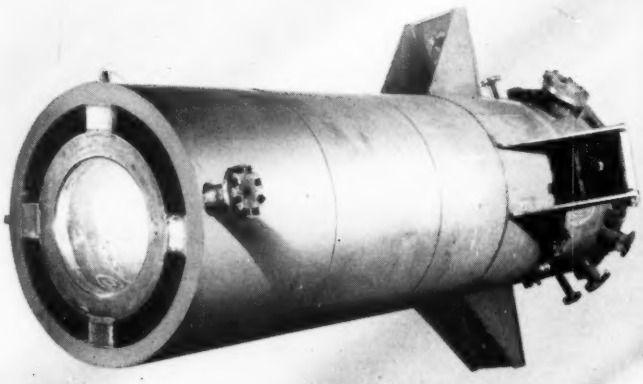
MALONEY CRAWFORD

P. O. Box 659 (Successor to Maloney Tank Mfg. Company) Tulsa, Oklahoma
Export Representative: JOHN H. BAIRD, 420 Lexington Ave., New York 17, N. Y.

PRICE 20 CENTS TABLE OF CONTENTS PAGE 35 NOVEMBER 30, 1946

SUPERIOR STAINLESS STEEL FABRICATING SERVICE





Stainless Steel Reactor for synthetic rubber plant.

Experience is combined with modern methods and equipment at Wyatt's to attain perfection in stainless lined, stainless clad or stainless steel fabrications.

WYATT METAL & BOILER WORKS

Wyatt's
HOUSTON - DALLAS

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE AVE., TULSA 1, OKLAHOMA

FOUNDED IN 1910 BY PATRICK C. BOYLE

Subscription rate to the petroleum industry, . United States and foreign, 1. year, $3.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

Copyright 1946 by The Petroleum Publishing Co.

Vol. 45, No. 30 November 30, 1946

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — KENNETH B. BARNES, *Engineering Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refining Editor*

W. L. NELSON, *Technical Editor* — PAUL REED, *Pipe-Line Editor*

Associate Editors

LYNN M. NICHOLS — NEIL WILLIAMS

CHARLES J. DEEGAN — R. B. TUTTLE

DAHL M. DUFF — D. H. STORMONT

District Editors

HERNDON DAVID, Tulsa 1, *211 S. Cheyenne Ave.* — T. A. ARMSTRONG, Tulsa 1, *211 S. Cheyenne Ave.*

TOLBERT R. INGRAM, Denver 11, *4556 Alcott St.* — E. H. SHORT, JR., Houston 2, *Sterling Bldg.*

H. STANLEY NORMAN, Los Angeles 14, *326 A, 610 S. Broadway* — HENRY D. RALPH, Washington 4, *Natl. Press Bldg.*

GEORGE H. WEBER, Dallas 1, *Mercantile Bank Bldg.* — WARREN W. BURNS, New York 17, *415 Lexington*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — O. C. PRESSPRICH, Saginaw, *News Bldg.*

C. DUDLEY JOHNSTON, *Staff Artist*

Advertising

WAYNE RIVES, *Manager*

MITCHELL TUCKER, *Eastern Manager*, New York 17, *415 Lexington Ave.* — CHARLES A. WARDLEY, *Pittsburgh Manager*, Pittsburgh, *435 Fourth Ave.*

C. R. FARMER, *Chicago Manager*, Chicago 2, *105 W. Madison* — J. HOWARD TINKHAM, *California Manager*, Los Angeles 15, *1406 S. Grand Ave.*

J. V. PENNINGTON, *Gulf Coast Manager*, Houston 2, *Sterling Bldg.* — RICHARD P. McKEY, *California Representative*, Los Angeles 15, *1406 S. Grand Ave.*

JOHN D. REILLY, E. S. KLAPPENBACH, *Tulsa Representatives* — A. J. CHAMBERS, Beckenham, *Kent, England*, *33, The Avenue*

J. PARKER HOLLAND, *Production Manager*, Tulsa 1, *211 S. Cheyenne Ave.*

Member Audit Bureau of Circulations Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Big-Inch Future Vague; All Bids Rejected 38
U. S. Considers Emergency Big-Inch Use 38
I.N.G.A. Recommends Curbing FPC Power at Annual Meeting 39
Power Association to Meet Next Week 40
Simons Named Manager of Texas Association 40
FPC Jurisdiction, U. S. Leasing Law, Discussed at Denver ... 42
Central European Nations Depending on Oil for Rehabilitation 44
Mid-Continent Burning-Oil Prices Advance with Crude 49
Deaths in the Industry 49
Ten-Cent Price Advance Effective in All But Two Areas 54
Gravity Schedule of New Crude-Oil Prices 54
Flat-Price Crude-Oil Schedule 57

Editorial 37
This Week 41
International News 43
Watching Washington ... 52
Pipe-Line News 99
Refining News 102
Natural-Gas News 104
Statistics and Trends 106

ENGINEERING AND OPERATING

Abnormal Gas Pressures Controlled 60
Oil Production by Water—Part 5 of a Series 64
Improved Pipe-Line Maintenance and Operating Methods 68
Bateman Field Cycling Operations 72
Modern Portable Units in Drilling and Well Servicing 77
Safe Field Practices: Machinery Guards 85
Geological Survey Completes New Rangely Structure Map . 86
Progress in Metals 88
Typical Fractionator Control Systems 90
The Refiner's Notebook 95
Engineering Fundamentals 97

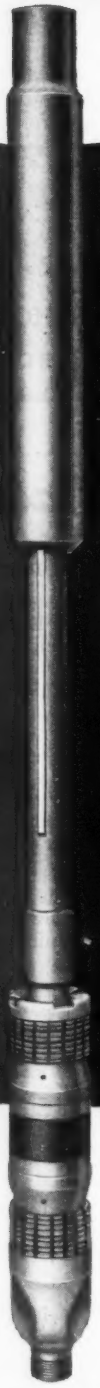
EXPLORATION AND DRILLING

Daily Well-Completion Record 106
Daily Average Production for Week 107
Exploration Economics 109
Reports by Areas Start on Page 109

ADDITIONAL FEATURES

Market Summary 106
Crude-Oil Prices 106
Drilling Contractors 122
Calendar of Events 123
Personals 124
Equipment Men in News 126
Classified Advertising ... 127
Advertisers' Index 130

And now, Magnesium!



Modern operators find Baker Cement Retainers completely successful for:

Re-Cementing • Squeeze Jobs

Cementing Behind Sections of Pipe

Testing Upper Cased Formations

Reducing Gas/Oil Ratios

Cementing Bad Pipe

Plugging Off Bottom Fluids

Cementing Off to Perforate for Production

Cementing Two Strings Together

Cementing Low Pressure Zones and Other Similar Operations

Right, Baker Junk Basket, Product No. 428.

THE BAKER JUNK BASKET is recommended for the removal of cuttings when drilling up any "drillable" materials such as magnesium alloys, bronze, etc. It is run just above the bit, and operates on the principle that by reducing the velocity of the circulation fluid (in which these cuttings are carried) as it enters the larger annular area around the drill collar, the cuttings are dropped out of the fluid and trapped in the Junk Basket.

BAKER OIL TOOLS

BAKER OIL TOOLS, INC., LOS ANGELES • HOUSTON • NEW YORK

THE OIL AND GAS JOURNAL

Evaluating Crude Oil

CRUDE-OIL price advances of the past week, applying, at this writing, to more than 80 per cent of the domestic production, give additional importance to recent discussions of many refiners as to whether present field relationships in crude-oil schedules accurately reflect their comparative value. The need for higher returns to producers is recognized, but refiners, after nearly 4 months of price decontrols, are fearful that prewar differentials will not be supported by future refinery markets.

The latest general advances in posted crude-oil schedules were preceded by local increases designed to meet conditions brought about by premium paying. The strong market for lubricating oils had induced buyers to pay substantial premiums for Gulf Coast crude oils of low cold test and high lubricating-oil yield. A comparable situation had also developed in the East Texas field, the premiums being due both to the quality of the oil and its nearness to markets. The advances in these areas quickly become general, regardless of local conditions and price differentials.

It will be recalled, in this connection, that today's gravity ratings are the result of premium paying for high-gravity crudes in the days when flat prices for crude oils were the rule. These gravity differentials are based on yields of gasoline, and their application in the 1920's did result in more stable and equitable crude-oil markets.

Even before the war there were complaints that comparative crude-oil prices determined largely by yields of straightrun gasoline, often low in antiknock rating, were outmoded by changes in processing methods and quality standards for motor fuels and other products.

Conditions partially brought about by the war and by peacetime developments have increased the demands for the intermediate and residual products. Crude oils with wide yields of quality diesel fuels and furnace oils have, in some areas, increased in value in relation to gasoline crudes. Lubricating-oil yields have become of major importance. Catalytic cracking and related operations have, of themselves, changed crude-oil values.

Changes in transportation conditions have had and will continue to have a bearing on the prices of crude oil. The delivered price of the crude oil is the criterion of value at the well head.

Admittedly, it is impossible to arrive at posted schedules which will accurately reflect all the varying values of crude oil by fields and leases. But there are certain broad relationships, dependent on the properties of crude oil, manufacturing practices, transportation, and consumer demands, which are undergoing constant change. These must be taken into consideration in crude-price schedules as the base for sound market conditions in both raw material and finished products.

Big-Inch Future Vague; WAA Tells Committee All Bids Rejected

by Henry D. Ralph

WASHINGTON.—Ultimate disposition of the Government's two big-inch pipe lines is more remote than ever as a result of the current hearings before the House committee investigating surplus-property disposal.

As matters now stand, War Assets Administration rejected all 16 bids filed July 30. Informal resubmission of offers by the 16 bidders is requested, but the bidders don't favor an informal procedure; they want the Government to lay down more specific provisions for bidding. The Army and Navy policy on military value of the lines appears to be undergoing a revision, and a more definite statement is awaited before formulating a new disposal program. A new disposal program, particularly if it opens the way for sale of the lines for gas use, would have to be submitted to Congress after the new session opens, with 30 days permitted for congressional disapproval.

Nor have the hearings done much to crystallize opinion as to what the lines are worth and what is their best peacetime use. The committee heard highly conflicting views that the lines could be more easily reconverted to military use if used for oil or if used for gas; that gas can and cannot be transported across Pennsylvania; that use for gas will and will not disrupt the coal industry; that the lines are and are not economical for oil use; that oil use would benefit and would ruin the oil economy of the Great Lakes-Ohio Valley region.

For the most part the hearings have disclosed the usual dreary picture of inept government administration—delay, lack of clear policy, adherence to a preconceived theory formulated by minor officials with only academic backgrounds.

Examples were the two reasons given by Littlejohn for rejecting all bids—military policy and low price. He reasoned that the old WAA policy favoring petroleum use was based on an Army view that this would facilitate recapture in case of war but that the Army-Navy Petroleum Board now takes no stand on the matter and this now requires a recasting of WAA policy.

The current appraised value of the two big-inch lines, Littlejohn said, is $113,700,000, and bids should come "within shooting range" of this figure. Many bidders agreed that this figure is about right, based on original cost less depreciation, but they argued that this does not measure the commercial value. It was brought out that the lines are depreciating at the rate of $10,000 per day, and in addition the Government is paying more than $60,000 per month maintenance costs to have the lines kept in stand-by condition, so delay in selling may cost the Government more than it might gain in higher bids later.

Additional comments on the question of disposal of the big-inch pipe lines are presented in "Watching Washington," page 52.

Furthermore, several bidders pointed out that their offers were certainly within "shooting range" of $113,700,000. Most vehement on this point were Big Inch Oil, Inc., which offered $110,000,000 ($66,000,000 cash immediately and $44,000,000 in income debenture bonds) and J. W. Crotty who offered $127,500,000 cash within 3 years.

About the only constructive suggestion made at the hearings came from E. DeGolyer, associated with E. Holley Poe in one of the bids. He said that before asking for bids the Government should decide definitely how the lines are to be used and how financed, and should state all terms and conditions, leaving only two blanks for the bidder to fill in, one giving the total price and one the amount of "barrel-head cash" on

(Continued on page 57)

U. S. Considers Emergency Big-Inch Use

WASHINGTON.—The Interior Department is considering emergency use of the big-inch pipe line system to "drift" natural gas from Texas and Louisiana to the Appalachian area to help alleviate the coal shortage, Asst. Sec. C. Girard Davidson told the House committee investigating surplus property.

No decision has been reached but Interior is asking information on technical, legal, and other aspects from War Assets Administration and the Federal Power Commission, both of which are very cooperative, Davidson said. He said WAA Administrator Littlejohn had agreed to permit Interior or its nominee to use the lines on an interim basis if requested.

Although some of the companies interested in obtaining an interim lease in the lines for gas transmission have called on him, Davidson told the committee the department has made no attempt to consult men in the gas industry who might assist in emergency plans. The committee appeared anxious to promote interim use and questioned Davidson closely as to why the department has not moved with more speed.

Three corporations told the House surplus-property committee they are prepared to make an interim lease of the big-inch lines during this winter and promised that within 3 or 4 weeks they could deliver substantial quantities of gas to the Pittsburgh area or farther east, using field pressures without compressors. All submitted definite plans for securing the gas and feeding it into the lines with very short connections, and each estimated the cost might be about $250,000, which they will advance.

Claude A. Williams of Transcontinental Gas Pipe Line Co., one of the bidders, made such an offer to War Assets Administration October 4, and told the committee he has commitments for ample gas in Texas and Louisiana fields crossed by the lines. Within 3 weeks of approval, he said, he could get 50,000,000 cu. ft. into Ohio and Pennsylvania distribution systems and raise this to 180,000,000 cu. ft. in 45 days.

Another bidder, Robert M. Bulkley of Big Inch Natural Gas Transmission Co., and his engineer, Faison Dixon, made a similar proposal, adding that they have obtained purchase offers from utilities and industries in the Pittsburgh area with mains crossing the big-inch route, and assurance of ample gas in Texas and Louisiana to move 100,000,000 cu. ft. without compression within 3 weeks and 140,000,000 in 2 months. WAA told them it had no authority to make an interim lease unless given an emergency directive from the Interior Department.

Gardner Symonds of Houston, president, Tennessee Gas & Transmission Co., not a bidder for big inch, requested an interim lease to take 50,000,000 cu. ft. per day of the company's own gas now without an outlet, putting it into the 20-in. line where the systems cross in Louisiana and selling to company's customers in Ohio which have lines crossing the big-inch route.

I.N.G.A. Recommends Curbing FPC Power at Annual Meeting

by George Weber

FORT WORTH.—Amendment of the Natural Gas Act to clarify and curb the powers of the Federal Power Commission was unanimously recommended by members of the Independent Natural Gas Association of America at its second annual meeting here November 22. The entire tone of the meeting was one of unequivocal opposition to the encroachment of FPC control over free enterprise in the natural-gas industry and continued action on the part of the association to limit the growth of federal restriction was demanded by practically all who addressed the sessions. Speakers discussing a wide variety of subjects concerning natural gas turned again and again to some phase of increased governmental control, calling for relief from its "stifling effects."

In his annual report, retiring President E. Buddrus, president of Panhandle Eastern Pipe Line Co., cited the activities of the association since its organization. In serving the natural-gas industry's interests, association representatives have participated in important matters before FPC and in the courts, he reported, including six major cases concerning the end-use theory, rate-making jurisdiction, well-head prices, and export. He described the association's part in hearings before the O'Mahoney committee and the biggest job of all, its share in the work of the Natural Gas Industry's Committee which presented the industry's side in FPC's general investigation of the natural-gas industry. He warned the industry to study carefully the report of recommendations for amendments to the Natural Gas Act, which FPC has promised to make available to the industry before it is submitted to Congress. Buddrus expressed satisfaction that INGA, now 3 years old with a membership of 1,600, had been tested and is recognized as a stable permanent organization which must be reckoned with wherever the industry's interests are concerned.

Mark H. Adams, Wichita, chairman of the association's legal committee, reviewed in detail the August 3, 1946, decision of the Fifth Circuit Court of Appeals on the Interstate Natural Gas Co. case, because "the principles and implications embodied in this decision appear to be a culmination of steps whereby the tentacles of federal control have apparently drawn within their grasp certain phases of the gas industry thought by producers and others to be completely excluded by the Natural Gas Act." He then explained the recommendations made by the Natural Gas Industry Committee as the result of the FPC natural-gas investigation and summarized the purpose of the proposed amendments to the Natural Gas Act. At the end of the business session, members approved those recommendations in full in a resolution carried unanimously.

Natural-Gas Reserves

Confining his remarks to natural-gas reserves, E. DeGolyer of Dallas briefly discussed recent national estimates of natural gas which range from 130 to 150 trillion cubic feet. He then turned to two related subjects: the deliverability of proved natural-gas reserves and the possibility of finding additional reserves in the Gulf Coast offshore area. Citing the common fallacy of dividing known reserves by current production rates to determine the life of proved gas reserves, he drew attention to the fact that calculation of the life of reserves must include the ability of wells to produce enough gas to meet seasonal peak loads. More engineering data are required to calculate this future productivity of wells and ultimately, reservoirs, he stated, adding that such data should be taken regularly under standard procedures before estimates of future deliverability of gas reserves can be made with any accuracy. The added cost of such systematized collection of well and field data would in his opinion prove worthwhile in furnishing management a basis for projecting future trunk lines, gathering systems, and compressor stations and most important, in computing future rate schedules for gas sales.

In describing the prospect of additional oil and gas reserves underlying the Gulf Coast waters, he used as an example the 5,000-sq. mi. area situated within the 30-ft. water-depth contour between the mouths of the Mississippi and Sabine rivers. At least 30 structures are indicated from the average density of such structures in the inshore area immediately adjacent, and geophysical mapping has definitely shown the existence of 6 piercement-type domes and 12 other structures. Extending the picture to include all shallow waters along the nation's Gulf Coast, he ventured to estimate that possibly 10 billion barrels of oil and an inestimable reserve of gas and condensate may be reached in future years by advances in offshore-drilling techniques. He expressed the opinion that the gas industry appears to be on the threshold of a great expansion and that he felt no apprehension as to the ability of the industry to meet market demands in the foreseeable future.

Granting the need for proper governmental regulation of the natural-gas industry because of its effect on the general public, D. A. Hulcy, president of Lone Star Gas Co., Dallas, stressed the importance of a free exercise of managerial discretion in conducting the business of a natural-gas pipe-line company. He pointed out that transporters are anxious to see that fields from which they obtain supplies are so operated and maintained that the greatest amount of gas will be recovered. In this respect, he stated, a proportion formula should be devised and applied in such a way as to assure the complete development of the field within a reasonable length of time on a well-spacing basis which is as uniform as possible. He averred that it would be far better for wells to be spaced too widely in the early life of a field in order to insure complete development on a uniform basis, than to space the early wells too closely at the cost of leaving portions of the field undeveloped forever. On the casinghead-gas problem, he urged a solution through closer cooperation among oil and gas industries rather than by imposition of rigid regulatory measures.

Consumer Preference for Gas

Capt. E. S. Pettyjohn, director, Gas Institute of Technology, Chicago, concluded the morning session with a discussion of the great consumer preference for natural gas in the Northeast, and the industry's problems in meeting that huge potential demand. This preference for natural gas over substitute fuels, made greater by inordinately low prices for natural gas is exerting an extreme pressure on gas distributors to increase their service in the North and East, especially in the house-heating field. The current seasonal peaks in demand which would be aggravated by further addition of that field impose considerable problems in storage, now under study throughout the market area. He listed the possibilities of developing additional gas demand during the summer valleys, including air conditioning, use of gas turbines for power generation, and conversion of gas into chemicals and motor fuel.

At the noon luncheon, the following directors were reelected to the 12-man board: H. W. Long, Guymon, Okla.; E. Buddrus; D. D. Harrington, Harrington, Hagy & Marsh, Amarillo,

Tex.; Joseph Bowes, president, Oklahoma Natural Gas Co., Tulsa; Paul Kayser, president, El Paso Natural Gas Co., El Paso; W. H. Wildes, president, Republic Natural Gas Co., Dallas. Gardiner Symonds, president, Tennessee Gas & Transmission Co., Houston, was elected to replace Elmer Schmidt, vice president, Lone Star Gas Co., Dallas. Terms of the remaining five directors do not expire until next year.

At the afternoon session, Dr. Frank Dotterweich, Texas A. & I. College, Kingsville, traced the development of the industry from its inception to the present. He described the trend of the industry's center from the Appalachian region to the Southwest where 75 per cent of the nation's reserves are located. The war record of 13⅓ trillion cubic feet of produced gas, amounting in thermal value to over one-third of the entire wartime oil production was noted, along with further figures on gas products used in the military effort. Attacking the current attempts of governmental agencies to fix wellhead prices of gas, he declared that a free market in view of expanding uses and demands for natural gas should be allowed to function, ultimately raising the price of gas in the field and thereby reducing gas waste.

A frank statement of royalty owners' position was presented by H. W. Long, of Guymon, Okla., who warned that if closer understanding of the royalty owner's rights was not reached by some natural-gas producers and transporters, the natural-gas industry would lose its solid front in opposing further governmental regulation.

Encroachment of FPC jurisdiction into state power was outlined step by step by Judge P. A. Lasley, of Little Rock, Ark. He told the history of the state's clash with FPC over primary jurisdiction of official corporate accounting records of electric utilities operating in Arkansas, and warned that unless halted by legislation, this trend would apply also to other public services in other states.

The association announced the merging of its Oklahoma City office with the head office in Washington, D. C. Present membership is listed as follows: Transporters, 42; producers, 143; royalty owners, 1,022; employes membership, 287; associate memberships, 79. Member companies furnish gas to 9 million of the total of 11½ million consumers of natural gas in the nation today, it was revealed.

Standard Announces New Insurance, Benefits Plans

CHICAGO.—Adoption of a life-insurance plan to provide $120,000,000 coverage for 24,000 Standard Oil Co. (Ind.) employes in 15 north central states and a new program of death benefits for annuitants were announced this week by Dr. Robert E. Wilson, chairman of the board, and A. W. Peake, president.

The life-insurance protection will amount to at least 1½ times each employe's annual earnings, except for those in high-salary brackets. The company will pay the whole cost of the first $1,000 and part of the cost of additional amounts. The new death benefits plan will be paid for entirely by the company.

Power Association to Meet Next Week

POWER utility and petroleum industry representatives from throughout the Southwest are expected to attend the eighteenth annual conference of the Petroleum Electric Power Association, to be held in the Mayo Hotel, Tulsa, December 3-4.

A series of talks emphasizing the relationship of electricity to the petroleum industry will be opened Tuesday afternoon by Max H. Halderson, of Phillips Petroleum Co., Bartlesville, speaking on, "What Utilities Should Do to Secure Production Business."

Other speakers Tuesday afternoon will be A. N. Horne, vice president and assistant general manager, Texas-Empire Pipe Line Co., Bartlesville, speaking on "Future Use of Electric Power for Pipe-Line Pumping," and W. H. Stueve, Oklahoma Gas & Electric Co., Oklahoma City, on "Refiners Viewpoint of Electric Power Usage."

Wednesday the conference will hear J. N. Poore, petroleum specialist with General Electric Co., Dallas, on "Electrification on Producing Oil Fields;" B. N. Brown, Westinghouse Electric Corp., East Pittsburgh, Pa., "Newer Electric Power Equipment for the Oil Industry," Fred Wetzel, district manager, Ingersoll-Rand Co., Tulsa, "Use of Electric Power for Pumps and Compressors in Oil Refineries;" and B. F. Thompson, Public Service Co. of Oklahoma, Tulsa, "Use of Variable Capacity Plunger Pumps With Electric Motors for Pipe Lines."

National Petroleum Council To Meet January 21

WASHINGTON.—The National Petroleum Council has been called by Temporary Chairman Walter S. Hallanan to meet in Washington January 21.

Hallanan also appointed a committee making nominations for permanent chairman and vice chairman, consisting of R. G. A. van der Woude, New York; W. H. Ferguson, Denver; B. L. Majewski, Chicago; Charles F. Roeser, Fort Worth, and Reece Taylor, Los Angeles.

Simons Named Manager Of Texas Association

DALLAS.—Election of Charles E. Simons, of Austin, as vice president and general manager of the Texas Mid-Continent Oil and Gas Association has been announced by Fred W. Shield, president. He will assume his duties January 1, succeeding the late George C. Gibbons.

For the past 3½ years, Simons has been executive vice president of the Texas Good Roads Association. Previously he was its public relations director and editor of Texas Parade, association publication.

Simons formerly was a member of the capitol staff of the Associated

CHARLES E. SIMONS

Press and also worked for the Dallas News and the International News Service bureaus in Austin. He was secretary of the State Democratic Executive Committee of Texas in 1942-44, secretary of the 1944 Democratic convention in Austin and Dallas, and a delegate to the Democratic National Convention the same year. He is a member of the Texas Chamber of Commerce Managers Association and an associate member of the Highway Research Board.

Burner Shipments Up

WASHINGTON. — September shipments of oil burners totaled 55,713, sending the cumulative total for 1946 to 343,003 against shipments of 106,422 in the same period last year. Residential burners accounted for 94 per cent of all units shipped in September.

THIS 1946 WEEK

INTERNATIONAL—Creole's daily average production in October reaches new high of 585,684 bbl.—4,145 bbl. daily over September. . . . ¶Richmond abandons 1 Caraballo, Colombia's deepest test, at 11,805 ft. . . . ¶Good show of oil reported in Texas Petroleum's Velasquez, another Colombian test about 120 miles south of Barranca Bermeja, drilled to 8,455 ft. . . . ¶Dedication ceremonies held for new Mexican refinery, 18 de Marzo, near Mexico City. . . . Name commemorates 1938 expropriation date. . . .

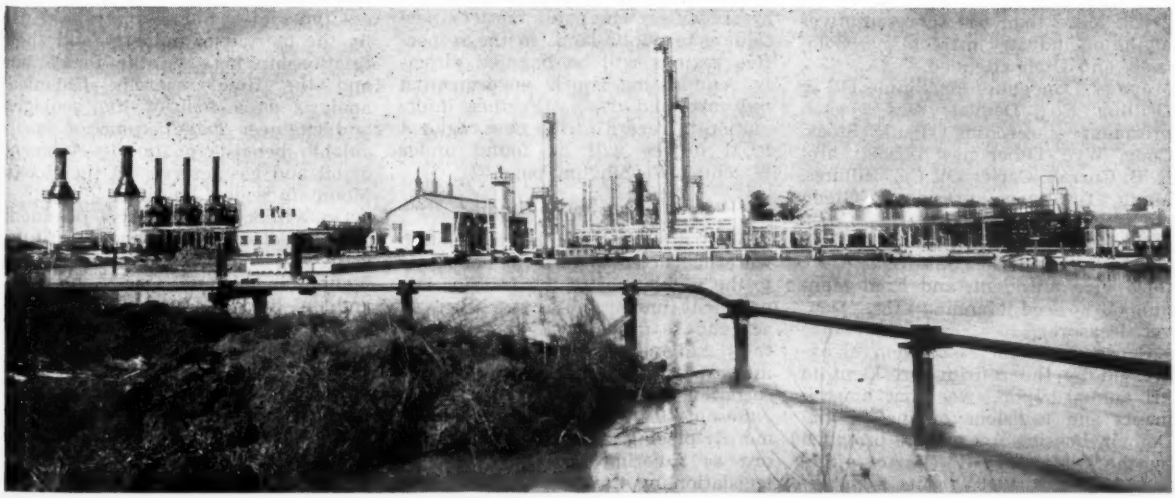
PRICES—Crude price advance spreads throughout Southwest, Midwest, and Rocky Mountain areas. . . . Increase generally 10 cents with various individual adjustments. . . . ¶I.P.A.A.'s weekly report says the gradual crude advances are encouraging but that the "goal has not yet been reached." . . . Average price of crude throughout nation, considering latest advance, now $1.69 per barrel. . . . ¶Last week's increase apparently spells end of stripper-well subsidy, though no official announcement has yet come out of Washington. . . . Oil Conservation Committee group asserts fight for permanent payment will be pressed in next Congress. . . . ¶Products prices respond to crude advance. . . . Burning oils up 1/8 cent with further increases expected. . . .

INVESTIGATIONS—Conflicting views on nearly all phases of the big-inch pipe-line problem characterize current House inquiry into the disposal question. . . . Hearings illustrate need for definite over-all policy, clear-cut bid specifications on part of the Government. . . . WAA head tells committee all bids have been rejected. . . . WAA testimony indicates Government may reconsider policy of favoring petroleum use in disposal. . . . Some bidders attack WAA methods, its action in rejecting the 16 offers. . . . Committee's investigation branches off into the question of possible use of the lines to relieve fuel shortage caused by the coal strike. . . .

GOVERNMENT—Walter S. Hallanan calls meeting of National Petroleum Council for January 21. . . . Names committee to nominate permanent chairman and vice chairman. . . . ¶Bureau of Land Management announces plans to decentralize administration into regional offices, eliminate delays and involved administrative procedure. . . .

MARKETS—A.P.I. says automobile, truck registrations are making an impressive comeback from wartime lows, despite vehicle-production difficulties. . . . Cites Public Roads Administration data estimating total registrations this year will reach 32,511,000, exceeding 1945's total by nearly 2,000,000. . . . Another A.P.I. report shows daily gasoline consumption increased 11.27 per cent in first 8 months of 1946 to daily average of 81,343,000 gal. . . .

EXPLORATION—Continental Oil finds deep pay in Madison lime on Circle Ridge dome, Fremont County, Wyoming. . . . ¶Prospective gas discovery in Cherokee County, Texas, may reveal southwest trend from Waskom and Carthage gas production. . . . ¶Shell of Canada plans continued development of Jumping Pound structure. . . . Decision to test gas reserves of structure follows failure in three attempts to develop oil production. . . . ¶Anderson-Prichard Oil Corp. opens new oil field on Lehigh structure in Marion County, Kansas. . . .



Surrounded by low-lying tidal marshes and accessible only by boat through canals which bound it on three sides, The Texas Co.'s gas-cycling plant in Bateman Lake field, 90 miles southwest of New Orleans, is supported entirely on concrete-capped piling. Nearest dry land is at Morgan City and Berwick, 3½ miles north of the field on opposite sides of the navigable Atchafalaya River, from where all equipment was barged to the plant site. The plant has a capacity of 70,000,000 cu. ft. of gas daily. Complete operations are described by Neil Williams, member of The Oil and Gas Journal staff, in a story which begins on page 72

Photo by Scott Boggess, Denver

Newly elected officers, Rocky Mountain Oil and Gas Association: Glenn Nielson, Husky Refining Co., Cody, Wyo., second vice president; James Donoghue, Mackinnie Oil & Drilling Co., Denver, president; Fred Manning, jr., Fred M. Manning, Inc., Denver, treasurer; R. B. Curran, Carter Oil Co., Billings, Mont., first vice president. Absent is Ed Holt, Utah Oil & Refining Co., Salt Lake City, third vice president

FPC Jurisdiction, U. S. Leasing Law Discussed at Denver Meeting

by Neil Williams

DENVER.—Public-land leasing regulations, jurisdictional limitations of the Federal Power Commission in its control of natural-gas movement, increasing tax impositions upon the oil industry, and the question of seeking enactment of a conservation bill for Wyoming were among the principal topics discussed at the annual meeting of the Rocky Mountain Oil and Gas Association here November 21-23. More than 650 representatives of the oil industry in Montana, Colorado, and Utah attended.

James Donoghue, Mackinnie Oil & Drilling Co., Denver, was elected president succeeding Paul Stock, Cody, Wyo. Other new officers are: R. B. Curran, Carter Oil Co., Billings, Mont., first vice president; Glenn Nielson, Husky Refining Co., Cody, second vice president; Ed Holt, Utah Oil & Refining Co., Salt Lake City, third vice president, and Fred Manning, Jr., Fred Manning, Inc., Denver, treasurer.

Consensus of the association, as expressed by the retiring president in his annual report, was that amendments and revisions of the Public-Domain Leasing Act of 1920 provided by the O'Mahoney-Hatch Act effective August 8, 1946, grants some relief from "burdensome and complex" regulations of the Department of Interior in administering the act, but that the new law only partially meets the industry's requirements.

Joel D. Wolfsohn, acting associate director of the newly created Bureau of Land Management, Washington, which will administer the act, outlined the various amendments and revisions in the act. He expressed the opinion that the reorganization and decentralization of administration of public-land control would greatly expedite dealings of the oil industry and Government. He announced establishment of regional land offices at six cities where all matters pertaining to public lands in the respective regions will be handled directly, eliminating much governmental red tape and delay. (Further information in regard to the new regional BLM offices will be found under Watching Washington, page 52).

Regulations to Be Studied

New directors of the association were instructed to give further study to the regulations of the Interior Department under the revised leasing act and to "take such action as in their judgment seems for the best interest of the industry and the association."

Resolutions were passed unanimously placing the association on record as favoring the enactment of legislation by Congress "closely limiting the jurisdiction of the Federal Power Commission in accordance with the original intent of Congress in passing the Natural Gas Act; that is, limiting its jurisdiction to the interstate trunk-line transportation of natural gas and the sale after such transportation is completed for resale for public consumption."

The resolutions stated that "the natural gas act should be further amended so as expressly to deny to the commission any authority to regulate (1) directly or indirectly production and gathering of natural gas, (2) the sale, including the price of natural gas sold by the producer or gatherer, and (3) the end use of natural gas."

A report of taxation committee adopted at the convention recommended opposition to any diversion of gasoline tax for purposes other than for highway construction and maintenance and to levying of additional tax on gasoline to provide funds for city and county purposes.

Indorsement was given the policy adopted by the American Petroleum Institute to keep the general public fully informed on all matters relating to the oil industry.

Following a heated discussion, the association voted to dismiss the legal and legislative committee from any further work in attempting to prepare a suitable conservation bill for the next legislature of Wyoming. The matter was regarded as too controversial for the association to pursue.

A resolution was passed calling attention to the value of its work and assistance given the association and the oil industry within the region by the Laramie, Wyo., station of the Bureau of Mines. The association went on record urging the continuance of the station and favoring additional financial support from Congress.

J. G. Crawford, Chemical Laboratories, Casper, Wyo., presented a paper on "The Role of Chemical Analysis in the Production of Gas and Oil." Crawford discussed four different types of chemical analysis in use by the petroleum industry and their relationship between the formations and the fluids therein. Chemical analysis as a tool of the geologist and engineer may become of incalculable benefit in the development of oil and gas reserves in the Rocky Mountain region, he said.

Dr. William O. Hotchkiss, president of Rensselaer Polytechnic Institute, addressed a joint session of the Rocky Mountain Oil and Gas Association and the Rocky Mountain Association of Petroleum Geologists on the closing day of the convention. He discussed the position of this country in respect to dwindling reserves of strategic nonfuel minerals and drew a parallel between this situation and that of petroleum. He stressed the need of the country to exert every effort to conserve its reserves of strategic minerals as a precaution against another possible war. A. A. Nicholson, assistant to the vice president, The Texas Co., New York, was the guest speaker at the annual banquet.

International

WORLD-WIDE OIL DEVELOPMENTS

Britain Converting Rail Systems to Oil

THROUGHOUT this winter workshops of Britain's railways will be busy converting from coal to oil-fired locomotives in a national campaign to conserve coal supplies.

With the country's export drive and the changeover in industry from war to peace putting an enormous strain on power supplies, the government has given orders for the conversion of 1,200 locomotives, most of which will be heavy-duty freight engines.

Famous passenger trains such as the Flying Scotsman, Golden Arrow, and Cheltenham Flyer will not be affected by the conversion for the time being.

The conversion program involves more than the relatively simple modifications on the engines themselves. Also necessary are the fitting of large numbers of tank cars with steam-coil heaters, since fuel oil must be kept heated to prevent thickening, construction of oil storage tanks, and training of train crews.

British government officials expect few people, aside from locomotive crews and men who work in the engine sheds, to be aware of the country's departure from the century-old practice of running steam locomotives on her native coal, but believe millions will be affected indirectly.

They know many ships will be required for the importing of more than 6,000,000 bbl. of fuel oil from fields throughout the world. Thousands of persons in unrelated factories or in their homes will benefit from an estimated 1,000,000 tons of coal which will be saved annually by the partial conversion to oil firing on Britain's railways.

Venezuelan Crude Arrives At Perth Amboy

NEW YORK.—The first shipment of Venezuelan crude to be run in the Perth Amboy refinery (which formerly belonged to Barber Asphalt Corp.) of California Refining Co. arrived in New York over the weekend. The shipload, 106,000 bbl., was purchased from the Creole Petroleum Corp. California Refining plans to buy approximately 3,000 bbl. daily from Creole for processing in the New Jersey plant which has a daily throughput capacity of around 18,000 bbl.

California Refining Co.'s Perth Amboy refinery is 55 per cent owned by Standard Oil Co. of California and 45 per cent by Barber Asphalt Corp. The first tanker load arrived on the "Petrolite," a government-chartered ship. California Oil Co. is the recently organized marketing company of California Standard and operates on the East Coast.

Topping Plant Planned In Kuwait

NEW YORK.—Plans for a topping plant in Kuwait, largely to provide diesel fuel for Kuwait Oil Co., Ltd.'s rigs there, are now in the formative stage. If materials can be obtained, construction probably will start in 1947. Daily capacity is expected to be around 2,000 bbl. daily, large enough to supply local requirements.

Kuwait Oil is jointly owned by Gulf Exploration Co., a subsidiary of Gulf Oil Corp., and Anglo-Iranian Oil Co., Ltd. Daily production in Kuwait is now up to 40,000 bbl.

Kuwait is an independent sheikdom in the northern end of the Persian Gulf.

Colombia's Minister of Petroleum Resigns

BOGOTA.—In a political situation comparable with the United States, where a strong Republican Congress will soon face a Democratic President, Colombia's minister of petroleum, Dr. Luis Buenahora, was among the ministers to resign.

In Colombia, President Mariano Ospina-Perez is a Conservative and Congress has a liberal majority, but the latter is split into three factions. Following the resignation of the five Liberal cabinet ministers, among whom was Buenahora, the other cabinet members also resigned to give the president full opportunity of cabinet reorganization.

The Liberal party held a caucus and decided not to support the president's coalition government.

Creole's Daily Output Sets New Record in October

CARACAS.—Creole Petroleum Corp.'s crude production in Venezuela continued its climb during October setting a new high of 585,684 bbl. daily. This compares with 581,539 bbl. during September.

Refinery runs in October dropped to 55,061 bbl. daily compared with 72,267 bbl. daily in September and a daily average of 58,504 bbl. in August.

October's 585,684 bbl. daily production showed 433,918 bbl. from Lake Maracaibo and Cumarebo and the remaining 151,766 bbl. daily from eastern Venezuela.

Sixteen oil wells were completed with one dry hole and no gas wells. The fields where these wells came in, their average initial production and depths follow: Jusepin, seven, 420 bbl., 4,419 ft.; Bolivar Coastal (B.C.F.), three, 1,242 bbl., 4,305 ft.; Mulata, two, 685 bbl., 5,652 ft.; Quiriquire, two, 323 bbl., 4,018 ft., and Cumarebo, one, 265 bbl., 1,370 ft. The dry hole was in Jusepin field.

New Mexican Refinery Dedicated by Camacho

MEXICO CITY. — Petroleos Mexicanos 18 de Marzo refinery went on stream last week, preceding by a day an inauguration ceremony attended by Pres. Manuel Avila Camacho.

The new plant includes a 30,000-bbl. topping unit; a gas-fractionation unit for production of liquefied petroleum gas, isobutane and isopentane; a 1,000-bbl. Dubbs thermal cracking unit, a 1,000-bbl. Phillips alkylation unit; a Universal Oil Products isomerization unit; a Perco cupric chloride treating plant; and a 10,000-kw. power plant.

The Concordia Vega refinery at Ploesti, Romania, following its bombing by the Fifteenth U. S. Air Force in September 1944

Central European Nations Depending on Oil To Finance Postwar Rehabilitation

by Herndon David

IN Central Europe, Austria, Hungary, and Romania are depending on petroleum as the main source of revenue and foreign exchange to finance their postwar rehabilitation. Production in Austria and Hungary has increased sufficiently to make up the decline in Romania, at least to the extent that these three countries can take care of their own requirements, plus those of Italy, Greece, Yugoslavia, and Czechoslovakia.

Producing fields of Austria, Hungary, and Romania are associated with a common regional tectonic feature, the Carpathian Mountains, and lie on the northern or outside edge of the arc formed by these uplifts, which themselves are a northern offshoot of the Alps. The arc begins about 30 miles east of Vienna, with the Little Carpathians, and extends through Slovakia, Poland, and thence south into Romania, near Buzau. From Buzau, the Transylvanian Alps portion of the Carpathians trend west almost to the Romanian border, thence in a sharp turn south across the Danube, then east again into Bulgaria and the Balkan Mountains.

The four main producing areas, all lying on the outside of the arc, are the Vienna basin, the Polish fields, eastern Romania, and most important of all, the Ploesti district of Romania.

On the inside of the arc, there is of course a basin area, which is cut up into one large basin, the Pannonian, and into several smaller ones formed by a series of interconnected mountains. Of the smaller basins, the Transylvanian basin is the largest. Within these basins are four producing areas, the Transylvanian basin, Trans-Danubia, Pannonian basin, and northeast Hungary.

International
WORLD-WIDE OIL DEVELOPMENTS

This article, written by a member of The Oil and Gas Journal's editorial staff, reviews the oil-producing areas of Central Europe. It places emphasis on the geology of the region and briefly summarizes the history of the development. It is made more timely by the present political conflict over possession of the oil resources in the countries involved.

Romania

Within an area, rectangular in shape, about 45 miles long and 15 miles wide, in southern Romania, lie the fields which have produced all but about 2 per cent of the country's oil and the greater portion of European oil.

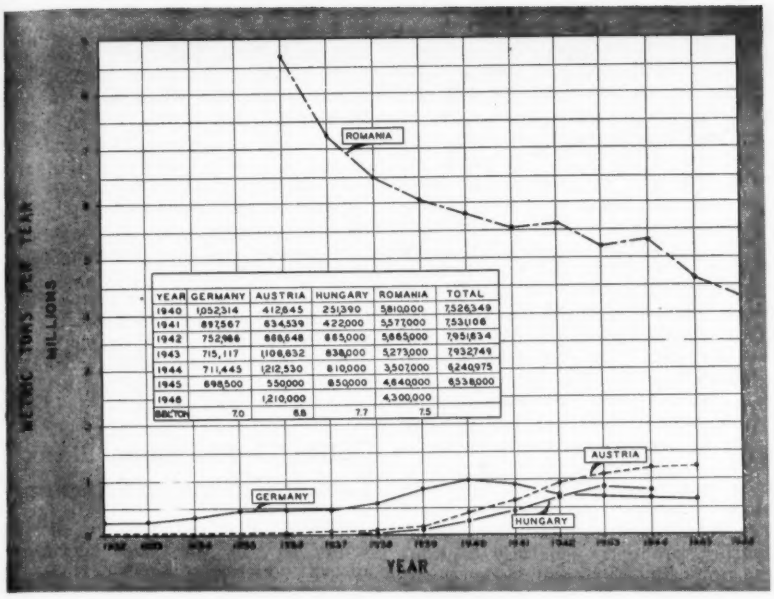
Nearly two-thirds of the total production has come from the area known as the Moreni-Baicoi trend. Although Romania had a substantial increase in production between 1920 and 1936, there were only three major discoveries in this period; extensions and deeper sands along the Moreni-Baicoi trend being mainly responsible for the increase. Both Moreni and Baicoi are piercement salt anticlines with dikes of salt at the surface.

Production is obtained from the Pliocene Tertiary, along faults and folds in the Pliocene basin, which are closely associated with salt, dikes of salt several miles long occurring in different places.

Producing Formations

The two main producing series are the Meotic and Dacian, of which the older Meotic is more regular and consistent, usually producing wherever favorable sand conditions and good structures are found together. As a whole, the Meotic averages about 30,000 bbl. per acre for the proved acreage.

The younger Dacic series is much more spotty in so far as finding oil saturation is concerned, and the fields are usually small in areal extent. However, when oil is found, the Dacic is much more prolific than the Meotic, the proven acreage averaging about 120,000 bbl. per acre, or four times as rich as the more uniform Meotic. Like the United States salt domes, the Dacic along the salt anticlines sometimes produces on one flank and not



YEAR	GERMANY	AUSTRIA	HUNGARY	ROMANIA	TOTAL
1940	1,052,314	412,845	251,390	5,810,000	7,526,349
1941	897,567	634,539	422,000	5,577,000	7,531,106
1942	752,986	888,648	885,000	5,865,000	7,951,834
1943	715,117	1,108,632	838,000	5,273,000	7,932,749
1944	711,445	1,212,530	810,000	3,507,000	6,240,975
1945	698,500	550,000	850,000	4,640,000	6,538,000
1946		1,210,000		4,300,000	
RATIO	7.0	8.8	7.7	7.5	

Producing trends of Central European countries

on the other. For example, there is an area on the south flank of the anticline which averaged about 350,000 bbl. per acre, while the opposite flank was dry. South of the Moreni-Baicoi trend, on a series of anticlines, the Dacic has yielded only small quantities of dry gas.

East Romania

In eastern Romania there are a few small fields of minor importance, all known for over three-quarters of a century. Three of these, in the Carpathian foothills, produce from the Oligocene, and several from the Miocene. Combined they have accounted for perhaps 2 per cent of Romania's production. Structures are steeply folded and complicated, costs are high, and little or no exploratory work has been done in the area for many years.

Future Exploration

The relatively small producing area compared to the seemingly structurally favorable region of substantial length along the mountain front, would seem to indicate that many new fields ought to be found. However, exploratory efforts seem to indicate that it is not so simple, for in the last three decades only three major fields have been discovered. Apparently this is due to lack of favorable sedimentation conditions in the Pliocene basin, which seems to have been limited on the northeast about the Trotus River and to disappear toward the west from the present producing area.

Transylvanian Gas

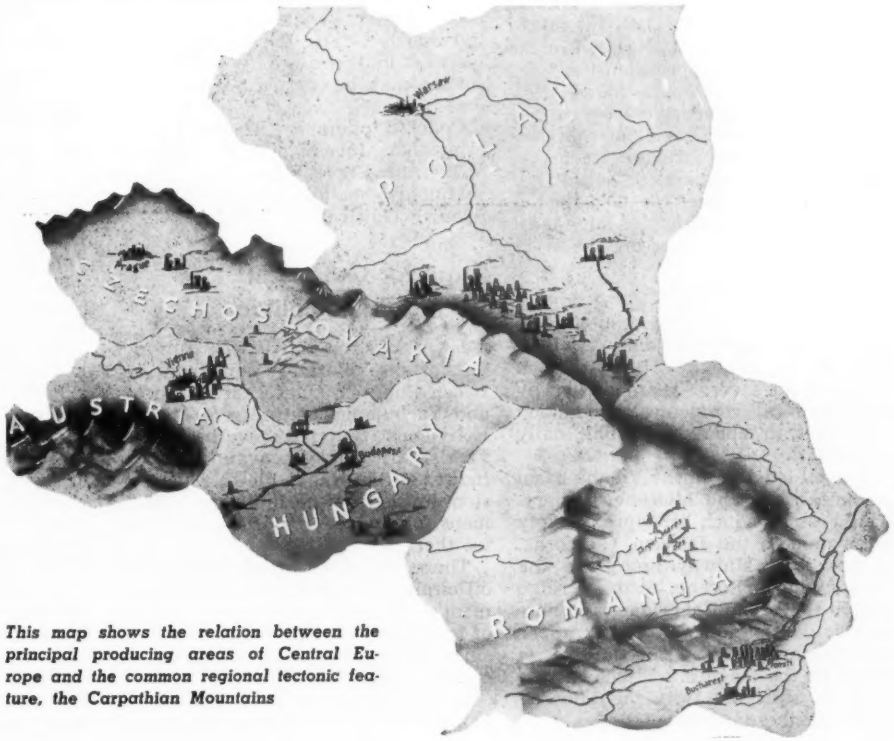
About seven domes in the Transylvanian basin have yielded dry gas in substantial volume from the upper Miocene; with prospects for oil disappointing to date, possibly because the oil-producing series of the Pliocene which produces around Moreni-Baicoi were not laid down in the Transylvanian basin.

After going from a low of 20,000 bbl. daily in 1920 to a high of 178,000 bbl. in 1936, Romania's production declined steadily to about 100,000 bbl. daily. Unless important new discoveries are made to augment production, it will continue to decline.

Hungary

This country's oil-producing history started just before the war, the first discovery coming in 1937. Thus far three producing fields have been found, Budafapuszta, Lovaszi, and Hahot, the last named being discovered during the war. The first two produce from a series in the Pliocene which is approximately equivalent to the Meotic production of southern Romania. They are rated as of major importance, with estimated reserves of more than 25,000,000 bbl. each. The third field, Hahot, produces from a Triassic dolomitic limestone.

All three fields are located in the small Pliocene basin southwest of Lake Balaton, which may or may not connect with the large Pannonian basin to the east. Budafapuszta and Lovaszi are normal anticlinal folds, thus conforming to the Meotic production pattern in Romania. Hahot is



This map shows the relation between the principal producing areas of Central Europe and the common regional tectonic feature, the Carpathian Mountains

on a structure formed by a buried ridge.

In the latter stages of the war between 1942 and 1944, some 22 exploratory wells were drilled in this part of Hungary, searching for new fields, but Hahot was the only oil success. The country's production is reported to have reached a peak of 18,800 bbl. daily in October 1943, and by July 1945, was down to 13,500 bbl. daily.

East of these fields in the Pannonian basin, 12 wildcats were drilled during the war, and north and west of Arad gas and condensate were discovered in two areas, Totkomlos and Korossegapati. Exploratory work in this area is confined to geophysical efforts due to a thick cover of Quaternary strata.

Poland

Since 1913, only one new field, Bitkow, has been found in Poland, and it is a minor field at that. The Boryslaw field, which is now steadily declining, is by far the largest field ever discovered in Poland, its ultimate production being estimated at about 200,000,000 bbl. Only one other field is estimated at more than 10,000,000 bbl. and the others are all less.

Production reached a peak of 41,000 bbl. daily in 1909, and has been on the downgrade ever since; although there are signs that at the 10,000 bbl. daily rate reached in 1938, a bottom may have been temporarily established, particularly if Gorlice-Lipinki field continues to get extensions.

The Polish fields are found in a tightly folded, extensively overthrust area in the foothills belt of the Carpathians. Surface structure seems to mean little as regards to subsurface conditions, and thus far no satisfactory methods or techniques have been worked out for interpreting the overthrust sheets.

Austria

Production in Austria amounted to only about 1,000 bbl. daily in 1938, but due to an exploration program inaugurated several years earlier by American oil companies, production increased to about 5,000 bbl. daily by 1942.

The oil is found in the Vienna basin in the Eocene and Miocene Tertiary. The Flysch, which is approximately equivalent to the Jackson, Claiborne, Wilcox, and Midway groups of the United States Eocene, forms a ridge within the basin. This ridge is in normal fault relations with the upper Miocene on the east side, and oil is found in the fractured Flysch on the upthrow side and from the Miocene sands on the downthrow side.

The Flysch is intensely folded, but the oil accumulation appears to be controlled by fracture zones independent of the folding. While some 15 Miocene sands have proved productive, accumulation appears to be confined to an area within a few hundred feet of the fault. The producing area extends 7 miles along the fault, but this does not appear to be a continuous productive zone.

The prewar Austrian refining industry is worthy of note, because of the peculiar type of plants that were built to get around Romanian high taxes on crude-oil exports, and the Austrian high taxes on refined product imports. The Austrian refineries were built as a combination of primary-distillation units and vacuum stills to separate a Romanian synthetic crude prepared to the Austrian customer's order by a Romanian refiner. The Austrian purchaser would specify a physical mixture of semi-finished products, generally containing proportions of gasoline, kerosene, distillates, and fuel oils, or lubricants. These would then be separated in the Austrian plant.

Two New Wells Will Test Sands in Spanish Project

BARCELONA, Spain.—Preparatory operations to spudding in two test wells about 74 miles west of here are about complete. Projected depths are approximately 5,500 ft.

If successful, this will be Spain's first production as previous operations failed to indicate the presence of oil sands, although seepings have been reported at Malaga on the Mediterranean Coast. Burgos is another location in Spain where some wildcatting may be carried out at a later date.

Concern planning the two tests is Compania Investigaciones Espanola de Petroleos Scientificas, S. A. (more commonly called CIEPSA). The Spanish Government is part owner.

Superior Gets First Nod to Enter Bolivia

LA PAZ, Bolivia.—While full details of an exploratory agreement between Superior Oil Co. of California and Yacimientos Petroliferos Fiscales Bolivianos (Bolivian Government Oil Fields) are not yet available, it is indicated that this is the first permission granted by the Bolivian Government for the reentry of foreign capital there.

There has been much interest in oil circles as to the Bolivian Government's attitude toward the reentry of foreign oil capital, and particularly since the establishment of a new government here.

Presumably Superior will carry on exploration work—shouldering all the risks and sharing in the profits, if any—in the Chaco district of southeastern Bolivia. Superior's agreement with Y.P.F.B. is subject to Congressional ratification, which some sources here think is certain.

Bolivia's projected oil law was expected to be passed this fall, but the political upheaval reportedly has delayed deliberations. Y.P.F.B.'s former president, Jorge T. Lavadenz, told the Journal last summer (July 27, page 128) that the bill was almost certain to pass and would allow mixed companies—Y.P.F.B. and private companies — to explore and develop vast areas generally regarded as excellent oil possibilities.

Caltex Organization Plans Tanker Expansion Program

NEW YORK. — Indicative of the scope of the postwar operations abroad which Standard Oil Co. of California and The Texas Co. expect to be engaged in is the fact that plans are now under way for large-scale purchases of tankers. These tankers are to operate under foreign flags.

Tanker purchases—and in at least one case transfer of ownership from an affiliate—will be made by the Overseas Tankship Corp., a recently organized subsidiary of which C. E. Olmsted, vice president of Texaco, in charge of foreign operations, originally was president. Overseas Tankship's new president is Andrew T. Carter, former Naval admiral and wartime executive officer of the Army-Navy Petroleum Board.

Following his discharge from the Navy, Carter headed United Overseas Petroleum Co., Ltd., a service organization which is another affiliate of California Standard and Texaco. His headquarters were in London. As president of Overseas Tankship, Carter will have New York City headquarters. A new president of United Overseas has not been named. F. G. Keéfe remains as general manager.

As part of the projected tanker expansion program, the California Texas Oil Co., Ltd.—the foreign marketing arm of California Standard and Texaco—will probably turn its tankers, which total about 20, over to Overseas Tankship. Caltex holds these tankers under various kinds of ownership and charter.

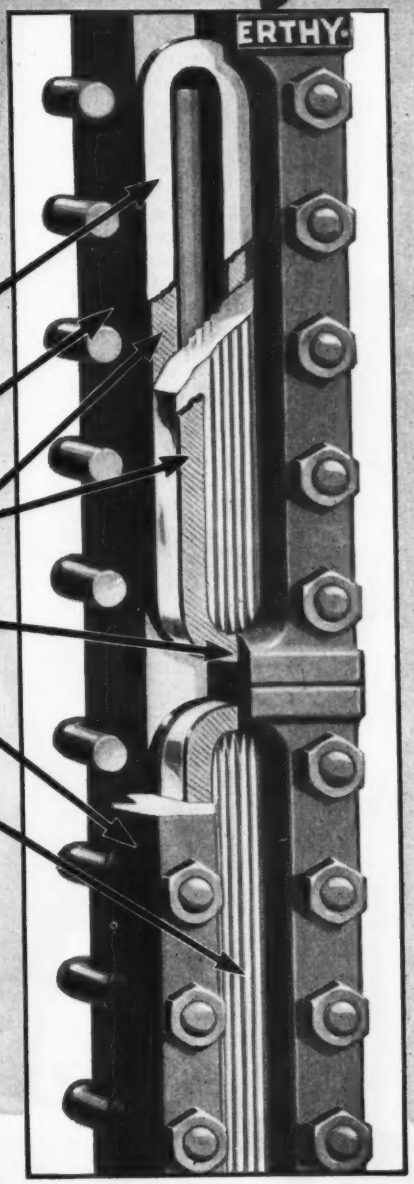
Colombian Test Abandoned

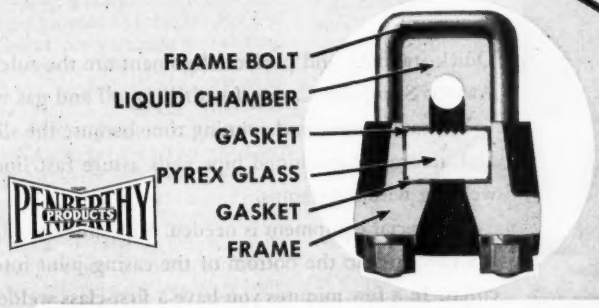
Richmond Petroleum Co. of Colombia abandoned on November 14 its 1 Caraballo at 11,805 ft. The well, located 46 miles southeast of Barranquilla, was Colombia's deepest test. It was spudded September 23. Only show was noncommercial gas.

Points of Superiority

PENBERTHY
DROP-FORGED STEEL *Reflex*
LIQUID LEVEL GAGES

- **GASKET GLAND** machined integral with liquid chamber fits snugly into glass chamber of frame preventing gasket blow-out.
- **LIQUID CHAMBER** alloy temperature resisting steel, heat treated, accurately machined and ground. Multiple section made in one piece.
- **GASKETS** are interchangeable and provide adequate and equal resilience on both sides of glass.
- **GLASS CHAMBER** in frame machined to contour of glass providing full metal backing for gaskets.
- **FRAME** drop-forged alloy temperature resisting steel with extra heavy beam at each end.
- **PYREX GLASS** has proved its greater strength and resistance to thermal shock and erosion.





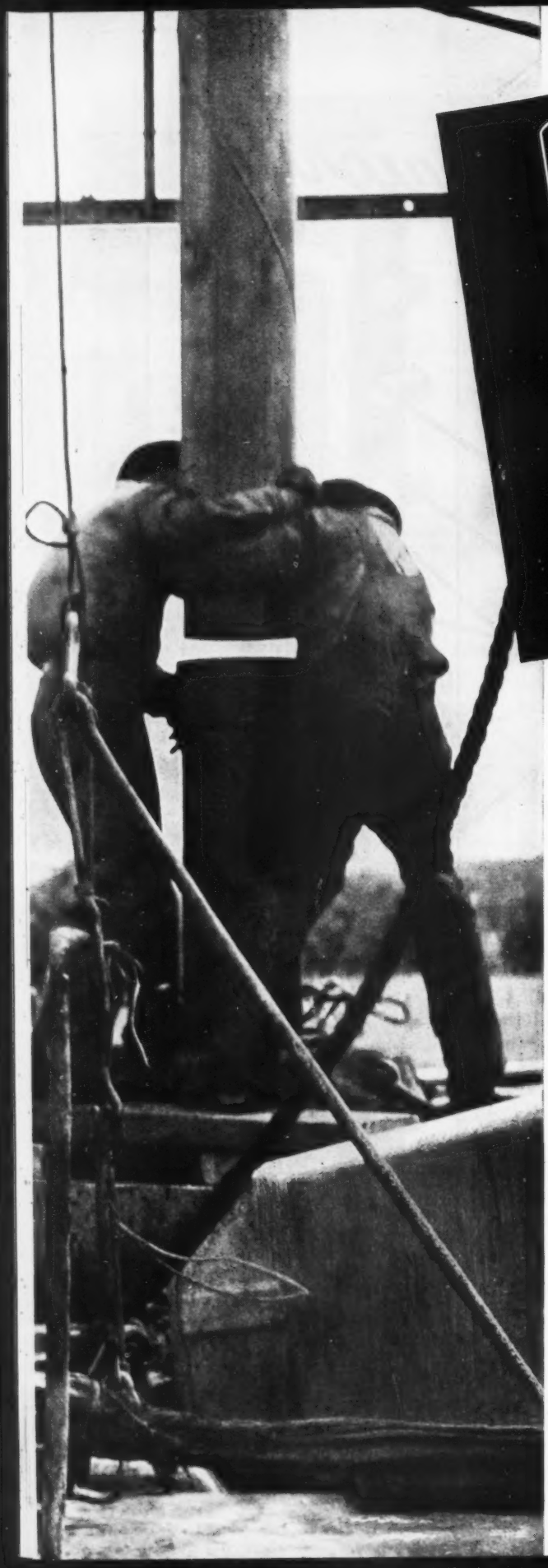
These Penberthy Drop-Forged Steel Reflex Liquid Level Gages are recommended for pressures up to 3000 lbs. per sq. in. at 100° F. and 1000 lbs. at 1000° F. They are provided in whatever lengths required and for various kinds of liquids. We shall be glad to quote upon your requirements.

Write for New Catalog No. 34-A

EMPTY SPACE SHOWS
WHITE
•
LIQUID SHOWS
BLACK

PENBERTHY INJECTOR COMPANY

Manufacturers of QUALITY PRODUCTS *Since 1886*
DETROIT, MICHIGAN • *Canadian Plant,* Windsor, Ont.



stabbing is easy

WITH THESE SLIP-JOINT COLLARS

Quick stabbing and perfect alignment are the rule when you use ARMCO Slip-Joint Casing for drilling oil and gas wells.

You save money and running time because the slip-joint collars and accurately machined pipe ends assure fast line-ups and easy welding without clamps.

No special equipment is needed. Slips and elevators fit the pipe. It's easy to stab the bottom of the casing joint into the slip-type collar. In a few minutes you have a first-class welded joint.

And remember, collars attached to ARMCO Casing cost *less than half as much* as welded joints.

ARMCO Casing is strong yet light in weight. Diameters range from 6" to 24", with a wide range of wall thicknesses. This means you can specify the exact size and weight of pipe you need. Write our distributor, or just address Armco Drainage & Metal Products, Inc., 3315 Curtis Street, Middletown, Ohio; 501 Mayo Building, Tulsa, Oklahoma.

ARMCO

SLIP-JOINT CASING

DISTRIBUTED BY THE NATIONAL TANK COMPANY

Mid-Continent Burning-Oil Prices Advance With Crude Increase

by Dahl M. Dufr

REFINERY prices of all grades of burning oils were strong at fractionally higher prices early this week following advances as a result of the general crude-oil price increase.

Tank-car quotations on burning oils moved up generally ⅛ cent in the Mid-Continent area, and further advances were anticipated in the near future. A considerably firmer trend was noted in the midwestern spot motor-fuel market, though contract prices were unchanged.

Continued cold weather throughout the north and the halt in coal production combined with the crude-oil price increase to improve petroleum products markets. Demand was heavy, with indications some suppliers are beginning to draw on long-filled heating-oil storage.

One informed marketer sand kerosene, 42-44, and range oil were extremely strong at 5½ and 5 cents, respectively. No. 2 fuel oil was bringing 4⅝ cents; No. 3, 4½ cents; and zero gas oil, 4⅜ cents. Residual fuel oil quotations rose from $1.26 low to $1.31, and an acute shortage of this material was foreseen if the coal strike continues.

Spot-market gasoline, which previously had been available in the Mid-Continent area at prices ranging down as low as 6½ cents, showed considerable improvement. Posted prices for contract motor fuel remained at 7-7⅛ cents, but under-the-market material was reported increasingly difficult to find.

Another sign of the rising products market was the action of Standard Oil Co. (Ind.) in raising prices of its various brands of distillates. Kerosene, heater oil, furnace oil, and light diesel was advanced ½ cent a gallon, and high-speed diesel, a cent a gallon. Indiana Standard explained its action was due to the crude increase. No change was made in gasoline prices.

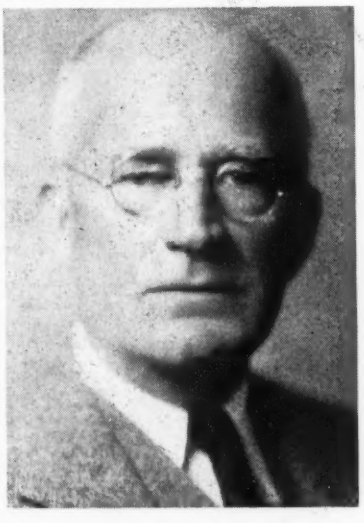
To absorb the crude increase, Mid-Continent refiners anticipated further advances in refinery prices of heating oils. It was pointed out a 10 cent advance usually calls for a ¼ cent rise in all products, but heating oils are expected to reflect most, if not all, of last week's advance because of the seasonal factor. One market source said a ⅜-cent rise in heating-oil prices would not be illogical.

Mid-Continent natural gasoline also showed strong tendencies early this week. The 26-70 grade was moving at 5 cents in Oklahoma—up ¼ cent —and 5¼, North Texas. Many suppliers were not quoting early this week because of the heavy demand for the winter blending material.

Probable effects of a prolonged coal strike held attention in the New York market. Residual was reported very firm at $1.92 per barrel. Two major New York hotels announced conversion to oil heating, and suppliers said they will have difficulty meeting demand if many others follow suit. Most New York suppliers were following the action of Standard Oil Co. of New Jersey in lifting the price of "cold" No. 5 fuel oil by 17 cents per barrel. The New York barge price was at $2.27 cents per barrel. Cold weather was steadying No. 2 prices at 6 cents per gallon low, but there was some evidence of shading of the 6.6 cent per gallon New York barge price of kerosene.

DEATHS

J. Edgar Pew, 76, vice president of Sun Oil Co. in charge of production and crude-oil pipe lines and a recognized leader in the petroleum industry, died November 22 at his home in Villanova, Pa.



J. EDGAR PEW

Known particularly for his leadership in bringing about the standardization of oil-field machinery and equipment, Pew was the first recipient, in 1936, of the Anthony F. Lucas gold medal of the American Institute of Mining & Metallurgical Engineers for distinguished service to the oil industry.

He is a former president of the Mid-Continent Oil & Gas Association and served the petroleum industry in various capacities during his 55-year association with the oil business. He recently was reelected a director of the American Petroleum Institute, which he headed as president in 1924-25.

He joined Sun in 1896, remaining with the firm until his death except for the period between 1913 and 1919 when he entered the independent operators' field in Tulsa and later served as vice president and western manager of Carter Oil Co.

Pew is survived by two sons, John G. Pew, Dallas, and George L. Pew, and a daughter, Mrs. Martha Elizabeth White.

Carl Buerbaum, Jr., 39, independent Tulsa oil operator, died November 21 in a hunting accident near Pecos, Tex. A former captain in the Army, he was associated wtih his father, Carl Buerbaum, of Dallas.

Arthur W. Jones, 40, Fort Worth, field production auditor for Gulf Oil Corp., died in an automobile accident November 23 near Sweetwater, Tex.

William L. Walker, 66, owner of the W. L. Walker Co., Tulsa equipment-supply firm, died November 16 at his home in Tulsa. Son of a leader in the infant petroleum industry in Pennsylvania, Walker later was associated with J. Arthur Hull and Harry Tyrrell in the gasoline business. He established the present firm in 1928 to manufacture oil-gaging equipment and handle industrial fire-fighting equipment.

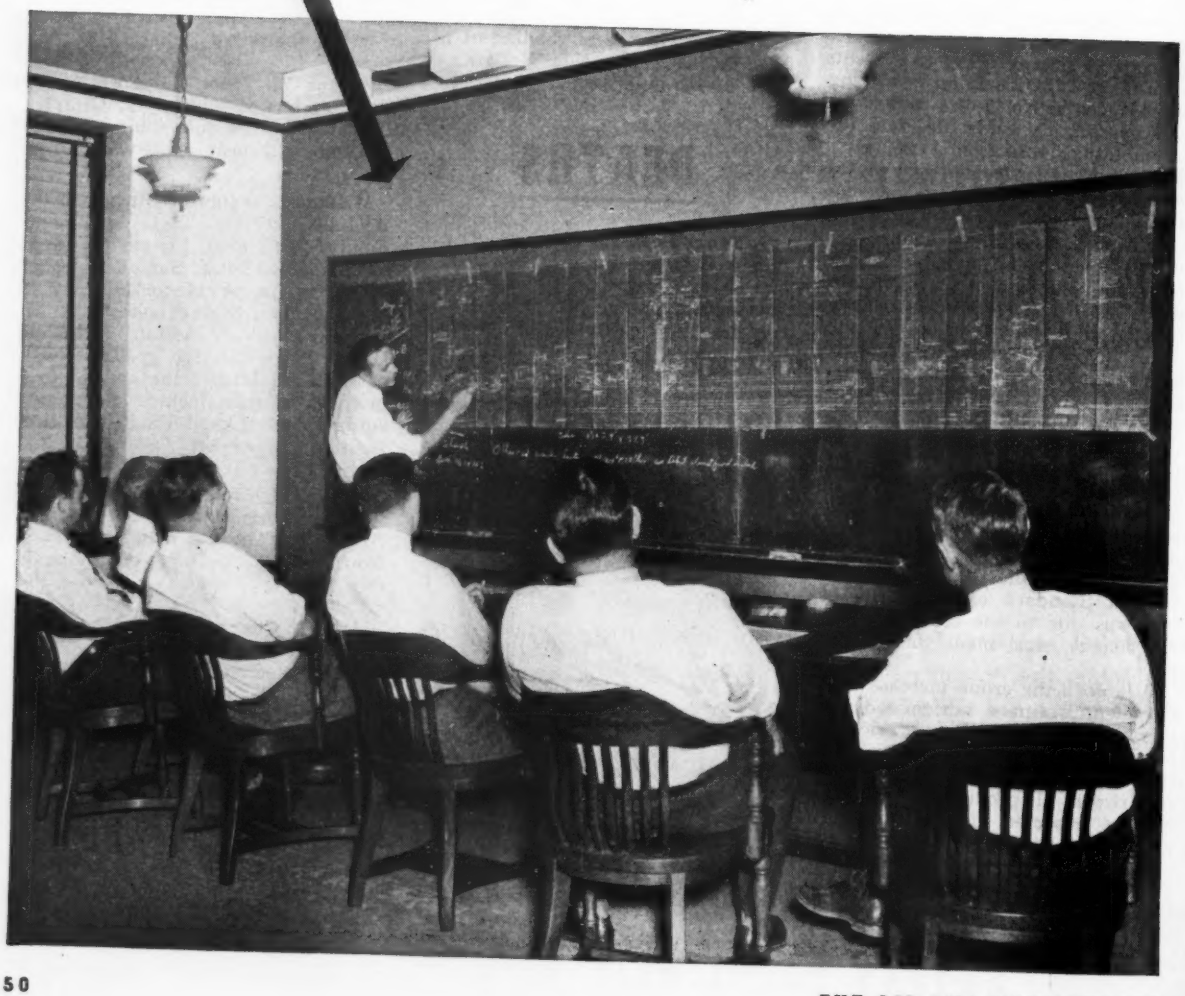
Harry W. Huber, sales and field service representative of Spang & Co., Butler, Pa., died in a plant accident November 18, his forty-eighth birthday.

John A. Chapman, 49, interest owner in the Grey-Wolfe Co., drilling concern, died November 21 in a Houston hospital.

S. S. Tannery, superintendent for 20 years of the Cities Service Oil Co. refinery at Okmulgee, Okla., now inoperative, died November 20 at his home in Okmulgee.

Frank Cross, 76, secretary-treasurer and a director of Sun Oil Co., died November 25 in a Philadelphia hospital.

When they say it's OK..



it's OK!

Refinery units designed by UOP have an uncanny way of fully measuring up to performance requirements right from the first moment of operation.

Perhaps one of the most important reasons for this accuracy . . . this foreknowledge of results . . . can be attributed to the UOP "conference board" of engineers. These men . . . each one a specialist in a particular phase of refining . . . pass on every proposed installation *before working drawings are even started.*

Preliminary flow diagrams and plans are submitted to this board. A thorough study and analysis is made by them. Each step of the process is discussed . . . the function and capacity of each individual unit is explored . . . every possible weakness is brought to light and corrected. These discussions may continue for days . . . flow diagrams may be changed again and again. But when this board has put their final OK on the plans . . . they're *OK.*

This procedure is typical of the thoroughness with which UOP handles every detail of their business . . . a business devoted to research, development, engineering, and service . . . a business that efficiently serves the petroleum industry.

UNIVERSAL OIL PRODUCTS COMPANY

General Offices: 310 S. MICHIGAN AVE. UOP CHICAGO 4, ILLINOIS, U. S. A.

LABORATORIES: RIVERSIDE, ILLINOIS

UNIVERSAL SERVICE PROTECTS YOUR REFINERY

WASHINGTON WATCHING

BY HENRY D. RALPH

A Discouraging Record

WASHINGTON. — Confusion over disposal of the big-inch pipe lines, currently being aired before a House investigating committee, is typical of the bungling that has characterized the entire war-surplus problem.

Here are two of the world's largest pipe lines crossing the heart of the United States. Their ultimate disposition will have a very vital effect on several important industries—oil, gas, coal, and their customers—and may alter economic conditions in cities along their route.

The lines completed their war service more than a year ago and ever since then the Government has been going through motions of trying to dispose of them. Two Senate committees held hearings on big-inch disposal last year; the Surplus Property Administration filed a special report on it in January; 16 private concerns offered bids, which were rejected; and now a House committee is starting all over again. Still there is no policy.

The Government can't decide whether the lines should be maintained in stand-by condition for military purposes, torn up for salvage, used for peacetime oil movement, or converted to gas transmission. The standards of the so-called policy set last January are so vague that no two of the 16 bids are at all comparable yet each bidder claims to have met these standards better than any other.

This year of indecision would not be so bad if it had been used in obtaining facts upon which to base a firm program for the future. But the situation today is even more confused than it was on VJ-Day, and there is no prospect of early clarification.

Certainly the dying committee of the lame-duck Congress will not come up with the answer. With no cross-examination of witnesses nor expert analysis of testimony the committee can do no more than disclose the confusion, and its report will have no special weight with the incoming Congress.

The Stripper-Well Subsidy

THE stripper-well subsidy may be entirely eliminated except for Pennsylvania Grade crude because of the current 10-cent increase in the price of crude.

Though no announcement has yet been made by the Office of War Mobilization and Reconversion, the last adjustment of subsidy payments indicated that rates would be reduced as posted prices advanced. The subsidy had been 75 cents per barrel for Pennsylvania Grade and up to 35 cents elsewhere, but the August price increases averaging 25 cents per barrel was followed by a 25-cent reduction in subsidies.

In a recapitulation of its subsidy programs last week the Reconstruction Finance Corporation announced that between July 1 and November 9 of this year it had paid out $10,800,000 in stripper-well subsidies, and added: "The stripper oil-well program, if continued on its present basis, would entail additional estimated payments of $4,200,000 during the remainder of 1946 and $7,500,000 in the first half of 1947."

Indecision in the Military

SEVERAL very specific questions must be decided by the Government before the big-inch pipe lines can be disposed of, and it is amazing that so little progress has been made toward even stating, let alone deciding, these questions.

First is the military value of the lines. Do the Army and Navy want them kept ready for quick recapture for military use in case of another national emergency, and if so could this condition be met by any peacetime use which came to serve a permanent need in the civilian economy? Apparently the military planners can't make up their minds about this, but it is the primary consideration in a disposal policy.

Second is the question whether it is legally possible to use the lines for natural gas. This involves both the right-of-way restrictions imposed by Louisiana and Pennsylvania, and the application of the Natural Gas Act to new long-distance transmission lines into the Northeast which has never been served with natural gas. Both these questions could be settled by Congress. Under its constitutional powers over interstate commerce Congress could direct the states to grant the necessary transit privileges to this or any other natural-gas line, and it could also clarify the natural-gas act by making it clear whether or not it wants the Federal Power Commission to authorize gas lines of this character. On the other hand, if conversion of the big-inch lines to natural gas is so problematical, or is certain to involve years of delay awaiting new legislation, then the entire matter of gas use should be ruled out of the present disposal procedure.

If, as many contend, the lines will be uneconomic for oil transportation unless the operator is free to convert them to gas within a couple of years, this question could be determined rather quickly if WAA would ask for firm bids for exclusive oil use and with a prohibition against conversion to gas.

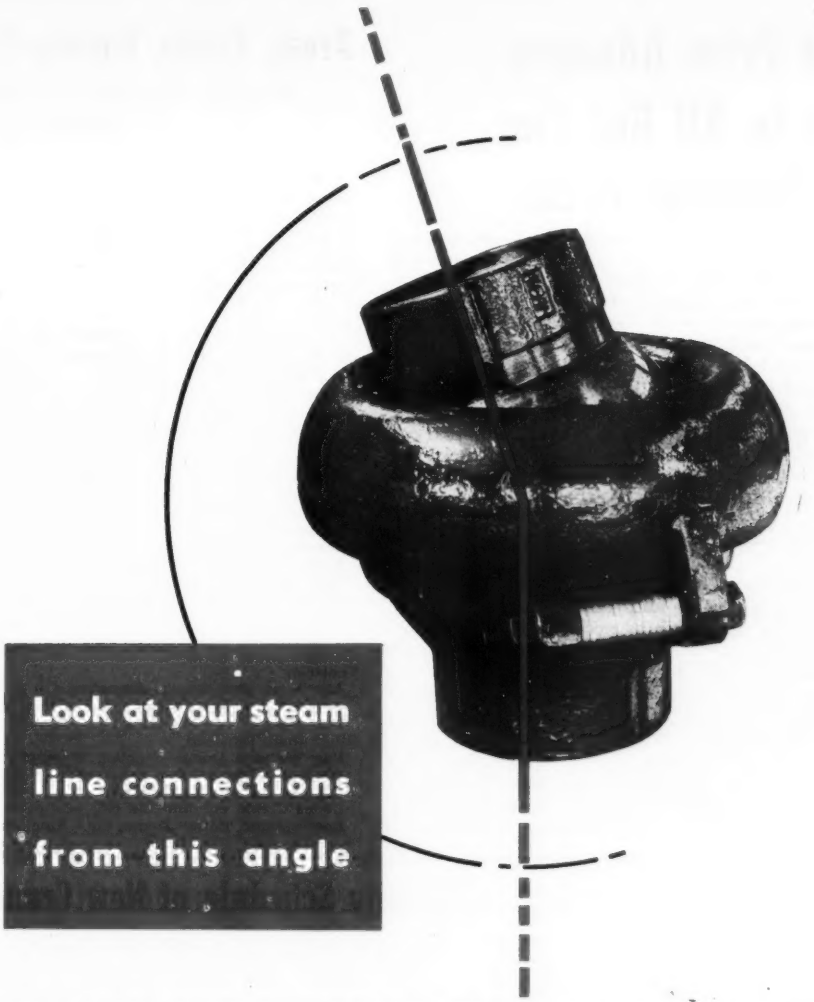
If the disposal agency feels it incumbent to determine in advance exactly how the lines should be operated and what effects their use will have on various industries and communities, then WAA or somebody ought to get busy with a thoroughgoing fact-finding inquiry including all possible angles and carefully weighing all evidence. To date most of the evidence has been opinions, and highly conflicting opinions at that.

Steps in the Right Direction

ALL district offices of the former General Land Office are being retained in the reorganization plan for the new Bureau of Land Management, which also includes the former Grazing Service, and these field offices are being given greater authority to settle oil and gas leasing matters on the spot without referral to Washington.

Questions which cannot be settled in the field will go to regional offices, which will be put in operation during the next couple of months. These will be in Portland for Washington, Oregon and Idaho; San Francisco for California and Nevada; Salt Lake City for Utah and Colorado; Billings for Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Iowa and Missouri; Albuquerque for New Mexico, Texas, Oklahoma, Arkansas, and Louisiana; Anchorage for Alaska; and Washington, D. C., for all other states.

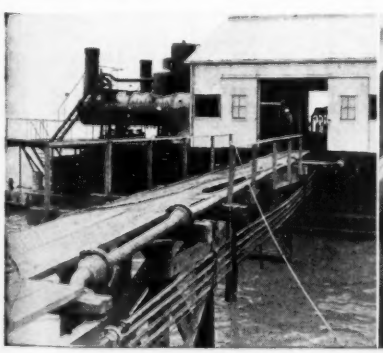
The entire BLM is being reorganized into six branches: land classification and planning, adjudication, engineering and construction, range management, timber and resource management, and administration. Both Washington and regional offices will be divided on this pattern. The adjudication branch will handle all matters of oil and gas leases, development of mineral resources on the public domain, and land patents, grants, and rights-of-way.



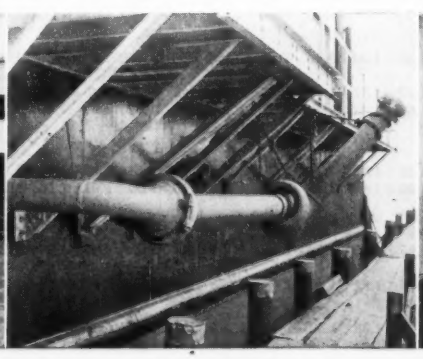
UNIBOLT "FLEXI-BALL" JOINTS

Here is a flexible joint for steam lines, misaligned connections, flexible manifolds, pressure-operated blowout preventer manifolds, rotary hose connections to standpipe and swivel, etc., whose life span is far greater than that of similar fittings. *Flexi-Ball Joints can be kept in service indefinitely and can always be dismantled with an end wrench because there are no threads between its component parts to gall and freeze.* Like other UNIBOLT Couplings, releasing a single bolt breaks the joint; tightening the bolt effects a seal. Complete interchangeability—another UNIBOLT characteristic—assures maximum economy due to replaceable parts. All Flexi-Ball Joints are designed for high pressure service and can, therefore, be switched at will from steam lines to mud lines.

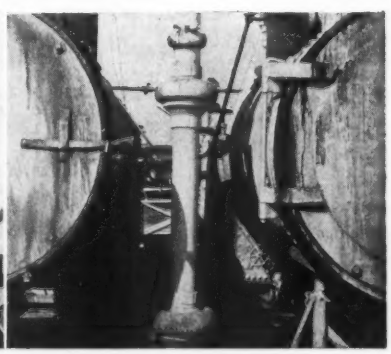
THORNHILL-CRAVER CO.
HOUSTON, TEXAS



6-inch Flexi-Ball Joints on steam line from boiler barge to drilling barge.



6-inch Flexi-Ball Joints on a boiler barge steam line.



6-inch Flexi-Ball Joints on a boiler "drop."

Ten-Cent Price Advance Effective in All But Two General Regional Areas

Detailed information showing new crude prices in various fields and areas is given in the tabulation and accompanying table on these two pages. Flat prices are listed on page 57. The information embodies all officially released postings received by The Oil and Gas Journal in the general upward movement of crude prices last week. To find the price for a particular crude, the area, field, and purchaser are located in the tabulation; the numbers shown refer to the column headings in the gravity-scale table.

A GENERAL 10-cent increase in the price of crude oil, except in California and Pennsylvania, spread through the industry last week as nearly all major purchasers swung into line with the price increase announced originally by Sun Oil Co.

Although the general over-all advance was 10 cents a barrel, individual variations ranged from 5 to 20 cents. Gravity scales were changed in many of the new postings.

The general advance, retroactive to November 15, was expected to end the federal Government's stripper-well subsidy payments, except to Pennsylvania producers. For details on subsidy, see page 52.

Areas, Fields, Posting Companies

(See page 57 for flat-price crude-oil schedule)

ARKANSAS

Field, county, parish, pool. Posted by—	Price Sched. Col. No.
Ark.-Tex—Atlantic Ref. Co.	26
Ark.-N. La. (sweet) sand—Standard Oil Co. of N. J.	37
Ark.-N. La. Rodessa, etc.—Standard Oil Co. of N. J.	27
Ark. (sour) lime—Standard Oil Co. of N. J.	39
Schuler (Jones sand)—Phillips Pet. Co.	4
Stephens—Ohio Oil Co.	2

COLORADO

Ft. Collins, Wellington—Continental Oil Co.	16
Iles—Stanolind Oil & Gas Co.	5
Walden—Continental Oil Co.	17

Rangely—Standard Oil Co. (Ind.). Below 21°, $1.20, 2-cent differential to 40° and above, $1.60 (not shown in gravity table).

KANSAS

All fields:	
Continental Oil Co.	9
Phillips Pet. Co.	9
Sinclair Prairie Oil Co.	27
Carter Oil Co.	9
Pure Oil Co.	9
White Eagle Oil Pur. Co., Inc.	9

MONTANA-WYOMING

Tensleep:	
Elk Basin, Salt Creek—Stanolind Oil & Gas Co.	19
Lost Soldier, Bailey Dome, etc.—Sinclair Wyoming Oil Co.	23
Other than Tensleep:	
East Mahone Dome—Sinclair Wyoming Oil Co.	33
Elk and Oregon Basin (Mont.-Wyo.)—Carter Oil Co.	1
Elk and Oregon Basin (Mont.-Wyo.)—Ohio Oil Co.	1
Lance Creek, etc. and Elk (lt.)—Ohio Oil Co.	5
Lost Soldier, Bailey Dome, etc.—Sinclair Wyoming Oil Co.	5

Gravity Schedule of New Crude-Oil Prices—

A.P.I. gravity—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
15-15.9	0.95																			
16-16.9	0.975																			
17-17.9	1.00																			
18-18.9	1.025																		1.025	
19-19.9	1.05																		1.05	
Below 20										1.23	1.38	1.43	1.51					1.48		
20-20.9	1.075									1.25	1.40	1.45	1.53					1.50	1.075	
Below 21			1.17	1.21	1.30															
21-21.9	1.10		1.19	1.23	1.32					1.27	1.42	1.47	1.55					1.52	1.10	
22-22.9	1.125		1.21	1.25	1.34					1.29	1.44	1.49	1.57					1.54	1.125	
23-23.9	1.15		1.23	1.27	1.36					1.31	1.46	1.51	1.59					1.56	1.15	
Below 24																				
24-24.9	1.175		1.25	1.29	1.38	1.31				1.33	1.48	1.53	1.61					1.58	1.175	
Below 25																				1.38
25 and above																				
25-25.9	1.20	1.38	1.27	1.31	1.40	1.33	1.275	1.30	1.40	1.35	1.50	1.55	1.63					1.60	1.20	1.40
26-26.9	1.225	1.40	1.29	1.33	1.42	1.35	1.295	1.32	1.42	1.37	1.52	1.57	1.65					1.62	1.225	1.42
27-27.9	1.25	1.42	1.31	1.35	1.44	1.37	1.315	1.34	1.44	1.39	1.54	1.59	1.67					1.64	1.25	1.44
28-28.9	1.275	1.44	1.33	1.37	1.46	1.39	1.335	1.36	1.46	1.41	1.56	1.61	1.69					1.66	1.275	1.46
Below 29															1.33	1.41	1.46			
29 and above																				
29-29.9	1.30	1.46	1.35	1.39	1.48	1.41	1.355	1.38	1.48	1.43	1.58	1.63	1.71		1.35	1.43	1.48	1.68	1.30	1.48
30 and above																				
30-30.9	1.325	1.48	1.37	1.41	1.50	1.43	1.375	1.40	1.50	1.45	1.60	1.65	1.73		1.37	1.45	1.50	1.70	1.325	1.50
31-31.9	1.35	1.50	1.39	1.43	1.52	1.45	1.395	1.42	1.52	1.47	1.62	1.67	1.75		1.39	1.47	1.52	1.72	1.35	1.52
Below 32																				
32 and above	1.375																		1.375	
32-32.9		1.52	1.41	1.45	1.54	1.47	1.415	1.44	1.54	1.49	1.64	1.69	1.77		1.41	1.49	1.54	1.74		1.54
33-33.9		1.54	1.43	1.47	1.56	1.49	1.435	1.46	1.56	1.51	1.66	1.71	1.79		1.43	1.51	1.56	1.76		1.56
Below 34																				
34 and above																				
34-34.9		1.56	1.45	1.49	1.58	1.51	1.455	1.48	1.58	1.53	1.68	1.73	1.81	1.58	1.45	1.53	1.58	1.78		1.58
35 and above																				
35-35.9		1.58	1.47	1.51	1.60	1.53	1.475	1.50	1.60	1.55	1.70	1.75	1.83	1.60	1.47	1.55	1.60	1.80		1.60
36 and above																				
36-36.9			1.49	1.53	1.62	1.55	1.495	1.52	1.62	1.57	1.72	1.77	1.85	1.62	1.49	1.57	1.62	1.82		1.62
37-37.9			1.51	1.55	1.64	1.57	1.515	1.54	1.64	1.59	1.74	1.79	1.87	1.64	1.51	1.59	1.64	1.84		1.64
38-38.9			1.53	1.57	1.66	1.59	1.535	1.56	1.66	1.61	1.76	1.81	1.89	1.66	1.53	1.61	1.66	1.86		1.66
39-39.9			1.55	1.59	1.68	1.61	1.555	1.58	1.68	1.63	1.78	1.83	1.91	1.68	1.55	1.63	1.68	1.88		1.68
40 and above			1.57	1.61	1.70	1.63	1.575	1.60	1.70	1.65	1.80	1.85	1.93	1.70	1.57	1.65	1.70	1.90		1.70

LOUISIANA

Field, county, parish, pool. Posted by—	Price Sched. Col. No.
Bayou Mallet, etc.—Standard Oil Co. of N. J.	36
Big Lake, Tepetate, etc.—Continental Oil Co.	11
Black Bayou (light), etc.—Shell Oil Co., Inc.	11
Black Bayou (heavy), etc.—Shell Oil Co., Inc.	28
Caddo—Magnolia Pet. Co.	20
Caddo—Stanolind Oil and Gas Co.	20
Charenton (below 28°)—Pan American Prod. Co.	40
Cypress Bayou, etc.—Standard Oil Co. of N. J.	38
Hackberry E. and W.—Stanolind Oil & Gas Co.	22
Jennings—Stanolind Oil & Gas Co.	21
La Place, Sorrento, etc.—Pan American Prod. Co.	11
Little Creek, etc.—Standard Oil Co. of N. J.	11
Lockport, W. Gueydan, etc.—Magnolia Pet. Co.	41
St. Gabriel (F sand)—Shell Oil Co., Inc.	13
Venice—Tide Water Asso. Oil Co.	34
(For other fields in La. see Ark.-La.)	

MISSISSIPPI

Cranfield, Guinville, etc.—Standard Oil Co. of N. J.	36
Eucutta and Heidelburg—Standard Oil Co. of N. J.	35
Pickens—Carter Oil Co.	6

OKLAHOMA

All fields:	
Champlin Refining Co.	5
Continental Oil Co.	5
Magnolia Pet. Co.	5
Mid-Continent Pet. Co.	5
Phillips Pet. Co.	5
Sinclair Prairie Oil Co.	27
Carter Oil Co.	5
Tide Water Asso. Oil Co.	5
North Hobart—Pure Oil Co.	8
Keys—Pure Oil Co.	7
Other Fields—Pure Oil Co.	9 or 5

NEW MEXICO

Field, county, parish, pool. Posted by—	Price Sched. Col. No.
Lea County—Shell Oil Co., Inc.	23
Lea County—Magnolia Pet. Co.	23
Lea and Eddy counties—Continental Oil Co.	15

TEXAS

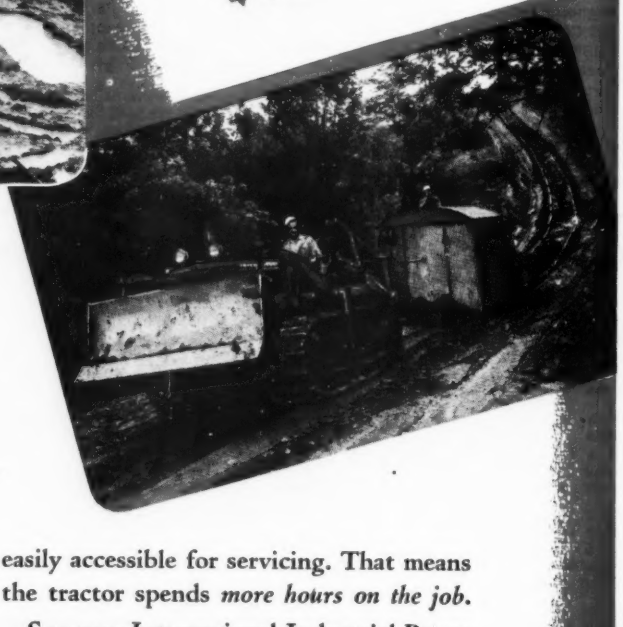
Abell—Sinclair Prairie Oil Co.	20
Alfred—Sinclair Prairie Oil Co.	12
Alta Loma—Pan American Prod. Co.	12
Barbers Hill—Atlantic Ref. Co.	24
Gray County—Wilcox Oil Co.	14
Gillock-Dickinson, etc.—Pan American Prod. Co.	11
Hastings and S. Houston—Pan American Prod. Co.	13
Howard, Glasscock, etc., counties—Col-Tex Refining Co.	23
Hendrick, etc.—Stanolind Oil & Gas Co.	23
Jackson County—Magnolia Pet. Co.	42
Jay Welder—Stanolind Oil & Gas Co.	12
Merando—Magnolia Pet. Co.	29
Merando (Heavy)—Sinclair Prairie Oil Co.	29
Merando (Light)—Sinclair Prairie Oil Co.	18
North Texas—Continental Oil Co.	17
North Texas—Panhandle Refining Co.	17
N. and N. Central Texas—Magnolia Pet. Co.	17
North Central Texas—Sinclair Prairie Oil Co.	27
Panhandle (Carson, Gray, etc.)—Magnolia Pet. Co.	17
Panhandle—Phillips Pet. Co.	5
Quitman, Manziel—Pan American Prod. Co.	10
Refugio and Greta—Atlantic Ref. Co.	25
Seeligson—Magnolia Petroleum Co.	12
Spindle Top, etc.—Stanolind Oil & Gas Co.	13
Starr County—Continental Oil Co.	18
Talco—Magnolia Pet. Co.	31
West Texas (with exceptions)—Atlantic Ref. Co.	23
West Texas (with exceptions)—Shell Oil Co., Inc.	23
West Texas (with exceptions)—Magnolia Pet. Co.	23
West Texas—Atlantic Ref. Co.	27
West Texas—Shell Oil Co., Inc.	27
West Texas (Fullerton)—Magnolia Pet. Co.	30
West Central Texas—Panhandle Refining Co.	9
Winkler County—Magnolia Pet. Co.	20

Midwestern, Rocky Mountain, and Southwestern Areas

A.P.I. gravity—	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
15-15.9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16-16.9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17-17.9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	...	1.16	1.33	1.26	1.21	1.19	...	1.48	...
Below 20	...	...	1.15	1.61	...	...	1.28	1.61	...	...	1.25	...	...	1.18	1.35	1.28	1.23	1.21	...	1.50	1.48
20-20.9	...	...	1.17	1.63	...	...	1.30	1.63	...	...	1.27	...	...	...	...	...	...	...	...	...	1.50
Below 21	...	...	...	...	1.55	...							...	1.20	1.37	1.30	1.25	1.23	...	1.52	
21-21.9	...	...	1.19	1.65	1.57	...	1.32	1.65	...	...	1.29	...	...	1.22	1.39	1.32	1.27	1.25	...	1.55	1.52
22-22.9	...	...	1.21	1.67	1.59	...	1.34	1.67	...	...	1.31	...	...	1.24	1.41	1.34	1.29	1.27	1.69	1.58	1.54
23-23.9	...	...	1.23	1.69	1.61	...	1.36	1.69	...	...	1.33	...	...	1.26	1.43	1.36	1.31	1.29	1.71	1.61	1.56
Below 24	...	1.59	...	...	...	...	...	...	1.66	...	...	...	...	...	...	...	...	...	...	...	...
24-24.9	...	1.61	1.25	1.71	1.63	...	1.38	1.71	1.68	...	1.35	...	...	...	...	...	...	...	...	...	1.58
Below 25	...	...	...	...	...	...	...	...	...	1.31	...	...	...	...	...	...	...	...	...	...	...
25 and above	...	...	...	...	...	...	...	...	...	...	1.37	...	...	1.28	1.45	1.38	1.33	1.31	1.73	1.64	...
25-25.9	...	1.63	1.27	1.73	1.65	...	1.40	1.73	1.70	1.33	...	...	...	1.30	1.47	1.40	1.35	1.33	1.75	1.67	1.60
26-26.9	...	1.65	1.29	1.75	1.67	...	1.42	1.75	1.72	1.35	...	...	...	1.32	1.49	1.42	1.37	1.35	1.77	1.69	1.62
27-27.9	...	1.67	1.31	1.77	1.69	...	1.44	1.77	1.74	1.37	...	...	...	1.34	1.51	1.44	1.39	1.37	...	1.71	1.64
28-28.9	...	1.69	1.33	1.79	1.71	...	1.46	1.79	1.76	1.39	...	...	...	...	...	...	...	...	...	...	1.66
Below 29	...	...	...	...	...	...	...	...	...	...	...	1.31	...	1.36	1.53	1.46	1.41	1.39	...	1.73	...
29 and above	...	...	...	...	...	...	...	1.81	1.78	...	...	...	...	...	...	...	...	...	...	...	...
29-29.9	...	1.71	1.35	1.81	1.73	...	1.48	...	...	1.41	...	1.33	...	1.38	...	...	...	...	...	...	1.68
30 and above	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.55	1.48	1.43	1.41	...	1.75	...
30-30.9	...	1.73	1.37	1.83	1.75	...	1.50	...	...	1.43	...	1.35	...	...	1.57	1.50	1.45	1.43	...	1.77	1.70
31-31.9	...	1.75	1.39	1.85	1.77	...	1.52	...	...	1.45	...	1.37	1.65	...	...	...	...	...	...	...	1.72
Below 32	1.57	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
32 and above	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.59	1.52	1.47	1.45	...	1.79	...
32-32.9	1.59	1.77	1.41	1.87	1.79	...	1.54	...	...	1.47	...	1.39	1.67	...	1.61	1.54	1.49	1.47	...	1.81	1.74
33-33.9	1.61	1.79	1.43	1.89	1.81	...	1.56	...	...	1.49	...	1.41	1.69	...	...	...	...	...	...	...	1.76
Below 34	...	...	...	...	...	1.68	...	...	...	...	...	...	...	...	...	...	...	...	...	1.83	...
34 and above	...	1.81	...	1.91	...	...	...	...	...	...	...	...	...	...	1.63	1.56	1.51	1.49	...	...	...
34-34.9	1.63	...	1.45	...	1.83	1.70	1.58	...	...	1.51	...	1.43	1.71	...	...	...	...	...	...	...	1.78
35 and above	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.65	1.58	1.53	1.51	...	...	1.80
35-35.9	1.65	...	1.47	...	1.85	1.72	1.60	...	...	1.53	...	1.45	1.73	...	...	...	...	...	...	...	...
36 and above	...	...	...	...	...	...	...	...	...	...	...	...	1.75	...	...	...	...	...	...	...	...
36-36.9	1.67	...	1.49	...	1.87	1.74	1.62	...	...	1.55	...	1.47	...	...	1.60	1.60	1.55	1.53	...	...	...
37-37.9	1.69	...	1.51	...	1.89	1.76	1.64	...	...	1.57	...	1.49	...	...	1.69	1.62	1.57	1.55	...	...	...
38-38.9	1.71	...	1.53	...	1.91	1.78	1.66	...	...	1.59	...	1.51	...	...	1.71	1.64	1.59	1.57	...	...	...
39-39.9	1.73	...	1.55	...	1.93	1.80	1.68	...	...	1.61	...	1.53	...	...	1.73	1.66	1.61	1.59	...	...	...
40 and above	1.75	...	1.57	...	1.95	1.82	1.70	...	...	1.63	...	1.55	...	...	1.75	1.68	1.63	1.61	...	...	...

INTERNATIONAL CRAWLERS

MOVE 'EM THRU THE MUD



● Mud—and plenty of it! But the equipment has to be moved. So oil men call on an International Crawler to pull them through.

These powerful crawlers are versatile. Dozers and winches, tailored to the job, can easily be mounted on Internationals. Full power can be taken from front or rear power take-offs to drive mounted equipment. It's easy to adapt Internationals to your specific requirements. Ideal weight distribution gives them *better balance* and transforms their dynamic Diesel power into *more drawbar pull.*

Internationals require less time for down time. Unit construction makes all parts easily accessible for servicing. That means the tractor spends *more hours on the job.*

See your International Industrial Power Distributor for the facts about performance-proven International Crawlers. He'll show you how Internationals will pull you through the tough jobs at a profit.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue · Chicago 1, Illinois

INTERNATIONAL HARVESTER

CRAWLER TRACTORS
POWER UNITS
WHEEL TRACTORS

INTERNATIONAL Industrial Power

Flat-Price Crude-Oil Schedule

Field, pool, county—	Price $/bbl.
ARKANSAS	
Big Creek	1.70
Calhoun Lime*	1.70
Columbia*	1.70
Dorcheat-Macedonia Lime*	1.70
Dorcheat-Macedonia Sand*	1.80
McKamie*	1.70
Smackover (Heavy)	1.38
COLORADO	
Florence-Canon City	1.50
ILLINOIS	
Basin	1.82
Louden	1.82
Mattoon	1.82
Plymouth	1.60
ILLINOIS-INDIANA	
Eastern Ill.-Western Ind.	1.67
KENTUCKY	
Hitesville	1.82
Robards	1.82
St. Vincent	1.82
LOUISIANA	
Bear	1.80
Cotton Valley*	1.85
Cotton Valley (Holloway)	1.75
Lisbon*	1.85
Neale (Beauregard Parish)	1.65
Ville Platte	1.80
West Mermentau	1.80
MONTANA	
Cat Creek	1.80
Cut Bank	1.75
Darling	1.55
Gage Dome	1.75
TEXAS	
Bee Creek	1.62
Boyle	1.80
Buchanan	1.62
Cayuga	1.37
Chapel Hill	1.63
Chapel Hill*	1.70
Cleveland-N. Cleveland	1.71
Columbus	1.62
Conroe	1.88
Dale	1.62
Dale West	1.62
Darst Creek	1.59
East Texas	1.70
Ellison Young	1.62
Ira	1.80
Lockhart	1.80
Luling-Branyon†	1.50
Lytton Springs	1.62
Pecos (Yates)	1.40
Riddle	1.62
South Tyler	1.70
Tomball	1.85
Willmar	1.45
WYOMING	
Big Muddy	1.58
Medicine Bow	1.925
Mulecreek	1.46
Osage	1.80

*Distillate. †Low gravity.

Big-Inch Future Vague

(Continued from page 38)

signing the contract. Several other bidders endorsed this, pointing out that no two of the 16 bids are comparable and that the terms of sale were so vague that all bids were rejected as not complying.

Just what the committee is driving at is difficult to divine. Questions indicated interest in the internal workings of WAA, whether oil or gas use is better, background of the bidders, proposed methods of financing, and almost any other phase of the subject.

Highlights of the testimony on principal aspects were as follows:

Right-of-way.—Allan Brown, attorney for Reconstruction Finance Corp. who was in charge of acquiring right-of-way for the two lines, testified that in general the titles and easements, obtained from some 7,000 different parties, are broad and firm and permit use for transporting anything that can be moved through a pipe line, though some of the titles are still in process of perfection.

However, the attorney general of Pennsylvania did not accept the standard language, so easements across state-owned lands and highways in Pennsylvania are good only for transportation of "petroleum or its by-products." Also the State of Louisiana conditioned its easements for that portion of the 20-in. products line crossing the state to require that the line shall not be used for exportation of gas originating in Louisiana without permission of state authorities.

This was news to some of the gas bidders, who said WAA officials had not indicated that there were any legal difficulties to use of the lines for gas beyond a few small title difficulties which could be cleared up with little effort.

The RFC attorney declined to give an opinion on the legal effect of the Pennsylvania restriction, but Rep. Francis E. Walter of the anthracite region of Pennsylvania testified that it is a clear and unequivocal prohibition against use of the lines for gas. He said WAA cannot give a valid title to a prospective gas user, and that the Commonwealth of Pennsylvania will never consent to the shipment of natural gas into or through the state because of the "irreparable damage" it would cause to the coal-mining industry.

Some of the gas bidders didn't take this threat very seriously, however. Pointing out that the state has always used some natural gas, they held that on a showdown the majority of Pennsylvanians would demand that they be allowed to use this fuel. Also that Pennsylvania's attitude is in violation of the interstate-commerce clause of the constitution. It was suggested that Congress could settle the matter by directing that the right-of-way be used for natural-gas transmission, or that the natural-gas act be amended to give power of eminent domain to any gas transmission company holding a certificate for construction from the Federal Power Commission.

Military recapture.—Most witnesses admitted that, as a practical matter, the big-inch lines could never be taken back by the Government for military use once they had become a part of the civilian economy, whether used for oil or gas, because industry would be so dependent on them that they could not be given up in time of war. However, there were some finely-split arguments.

Oil bidders said that recapture after oil use would be simpler because pumping equipment would not have to be reconnected, and the lines would be ready for military shipments on "5 minutes' notice." If used for gas, they said, cities could not be cut off from fuel in order to ship military oil through the lines.

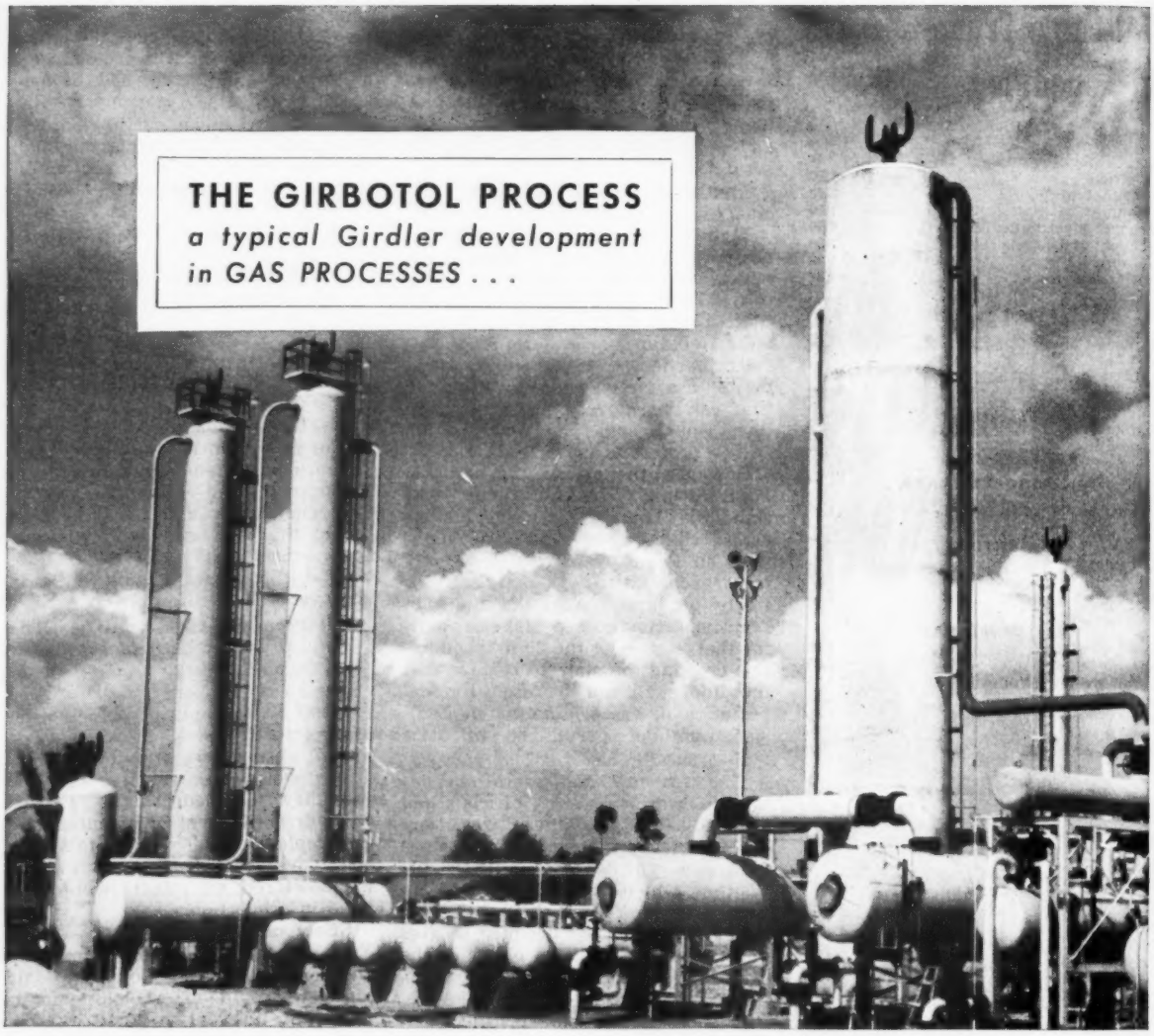
Gas bidders countered that cities would use big-inch natural gas only for enriching manufactured gas and would keep stand-by plants ready for emergency in case of war; or that one of the two lines, with stepped-up pressure, could meet the gas demand during a war, leaving the other line available for the military.

Effect on the coal industry.—Sale of natural gas in the New York metropolitan area would ruin the Pennsylvania coal industry and disrupt the economy of the entire Northeast, according to Congressman Walter. But several gas bidders said the coal industry wouldn't be hurt a bit. The gas, they reasoned, would be used only for enrichment of manufactured gas, replacing fuel oil for this purpose, and as consumption grew the manufactured gas plants would expand in proportion.

Effect on the gas industry.—P. A. Frye, executive director of natural-gas conservation for Louisiana, said his state would do everything in its power to prevent export to other states of Louisiana's limited reserves of natural gas because it was badly needed for home industries. He predicted that before long the Southwest might have to import coal from Pennsylvania to have fuel. He also predicted that the Federal Power Commission would never grant a certificate for a gas transmission line to the Northeast, citing the 1940 FPC opinion in the Reserve Natural Gas Co. case.

Gas versus oil.—The big-inch lines should be used for oil, said Wilbert T. Fritz of WAA staff, because they can carry 6½ times as many heat units in oil as in gas. So what, countered gas bidders; if this argument means anything then all gas lines would be converted to oil.

They are the most economical oil pipe lines ever built, have made obsolete all smaller-diameter industry-owned pipe lines, are the cheapest method of overland transportation between the Gulf and the Atlantic Seaboard, and can compete with tankers in this movement, Fritz declared. This was pretty much admitted by most of the other witnesses. Some



"Proof of the pudding . . ."

FOR your money's worth in gas processes, deal with the organization that offers tangible evidence of wide, practical experience in the field.

This Girbotol plant is one of many engineered and constructed by Girdler since originating the GIRBOTOL PROCESS for the effective, economical removal of hydrogen sulphide from natural gas.

And the GIRBOTOL PROCESS is one of many gas processes which Girdler designs and builds—processes for gas manufacture, purification, separation, and dehydration—processes involving hydrogen sulphide, carbon monoxide, carbon dioxide, inert and controlled atmospheres, natural gas, refinery gases, liquid hydrocarbons, hydrogen, nitrogen.

• • • • •

For further proof, and for direct evidence of what this wealth of experience means to you, write today giving an outline of your specific problem in gas processing. Get Girdler engineers—specialists in gas processing—on the job and be sure you are getting men best qualified for the work.

WE DON'T GUESS ABOUT GAS

CHEMICAL ENGINEERS AND CONSTRUCTORS

The GIRDLER CORPORATION

Gas Processes Division, Dept. OG-7, Louisville 1, Ky.
District Offices: 150 Broadway, New York 7, N. Y.
2612 Russ Bldg., San Francisco 4, Calif.
21 E. Second St., Tulsa, Okla.

said East Coast refiners would prefer tankers regardless of cost because of their flexibility, while others thought tankers would be displaced but would find new routes in other parts of the world.

The proved wartime operation of the lines and the present market demand in the Northeast makes the lines worth their full appraised value of $113,700,000 as oil carriers, Fritz said, but as gas carriers they are worth only $76,000,000 (after deducting the unusable petroleum equipment) and a new 30-in. gas line could be built cheaper and have greater capacity.

Oil bidders advanced other arguments: The lines could be put into oil use immediately but it would take a year to get an FPC gas certificate and install compressors and connecting lines. The federal pipe-line tax on oil transmission would yield the Government $1,500,000 per year in addition to the sales price. The petroleum demand in the Northeast is much higher than anticipated a year ago, while excess crude productive capacity in the Southwest is seeking outlets, thus assuring ample business for the lines as oil carriers. The only surplus pipe lines in the United States are the old industry-owned 8-in. lines, as proved by the fact that several companies are discussing plans for new 20-in. lines from the Southwest toward the Great Lakes area in an attempt to grab off this business before the big-inch lines can be put back in operation.

Effect on the oil industry. — This subject was limited to the possibility that the lines might serve the Great Lakes-Ohio Valley area instead of as through carriers to the Atlantic Seaboard. W. W. Van de Veer, president of the Allied Oil Co., Cleveland, and Sidney A. Swensrud of Ohio Oil Co., insisted that any oil use of the lines would be uneconomic, but particularly opposed service to the interior. They said this would ruin many independent refineries in the area, disrupt the marketing pattern, unbalance the supply picture, and leave the bulk of the nation's steel-producing capacity without residual fuel oil which is now supplied by area refineries but which could not come through a products pipe line.

WAA operation. — The committee was quite curious about WAA personnel and procedure. It learned that the policy of preferring oil use, laid down in the January report to Congress by Surplus-Property Administrator Symington, was formulated and followed by L. Gray Marshall, head of the WAA utilities branch, and his two pipe-line assistants, J. S. Jenner and W. T. Fritz. While none had had experience in the oil or gas industries, they thought that the O'Mahoney committee of the Senate, which held hearings on the big-inch a year ago, gave too much consideration to the views of the oil industry and not enough to the viewpoint of the military.

These three admitted that they were ready to recommend acceptance of the bid of Big-Inch Oil, Inc., with some modifications in method of financing. An informal, that is, unsigned, recommendation to that effect had been presented to the Real Property Disposal Board, which also had considered it "informally." The committee was much intrigued by the degree of informality within WAA.

The staff was evidently out of sympathy with Administrator Littlejohn's action in rejecting all bids. They could not explain the action and said he had not conferred with them about it. They also disagreed with Littlejohn's interpretation of the Army and Navy viewpoint on national-defense features of the line.

Big-Inch Oil, Inc.—Since it had been suspected for weeks that this concern had the inside track at WAA, many other bidders sniped at this offer. It was called a token attempt to operate the lines as oil carriers but with the actual intent of converting them to gas.

A vigorous defense of his offer was made by Charles H. Smith, president of Big-Inch Oil, Inc. Originally, he said, his group sought the lines for gas, but put in an oil bid because studies convinced them they could operate economically in that service, military recapture would be impossible if converted to gas, and the gas demand could better be met by construction of a new 30-in. gas line (on the same right-of-way or around Pennsylvania) if, as, and when construction materials and FPC authorization could be obtained.

A thorough study by experts demonstrates that sufficient crude and products will be available, after construction of feeder lines, to operate both big-inch and little big-inch at high enough capacity and low enough rates to make a profit, Smith said, and with one or two exceptions the large Atlantic Seaboard refiners and marketers will use the lines. He contemplated that most of the crude and products would go clear through to the seaboard but that those taken off in the interior would not damage Ohio Valley refiners.

Financing methods.—The committee asked many questions about financing plans, apparently being skeptical of all bids which proposed that the Government take securities as part payment. The committee also seemed to lean toward those who offered to furnish cash raised among their own associates rather than proposals to organize corporations to sell securities to the general public.

This line of questioning brought a variety of responses from the bidders. Most of them contended that a demand for all cash is unfair because of the length of time required before the lines can show an operating profit, whether used for oil or gas. Some contended that both financing and control should be kept within the bidding group, while others argued that public sale of securities would insure against monopoly control.

Other bidders.—Spokesmen for most of the 16 bidders defended their proposals as best meeting the WAA policy, and criticized WAA for not agreeing.

E. O. Thompson, of the Texas Railroad Commission, strongly urged use of the lines for gas as a conservation measure, saying this would increase market outlets and double the field price for flare gas now wasted in connection with oil production, thus making it legally possible for Texas to require that such gas be utilized.

Claude A. Williams, of Austin, president of Trans-Continental Gas Pipe Line Co., one of the bidders, said his organization offered $85,000,000 cash, to be raised without public financing, with an alternate proposal including pumping stations which would give the Government $92,000,000.

WAA favors oil use because its negotiations are "obsessed with a crusaders' complex to break up an allegedly monopoly in the transportation of petroleum," Williams said, describing this as "pure romance," because of this position, he said his company would convert the 24-in. to gas but make a serious effort to keep the 20-in. in oil service by moving crude from Texas to the Cincinnati-Toledo area.

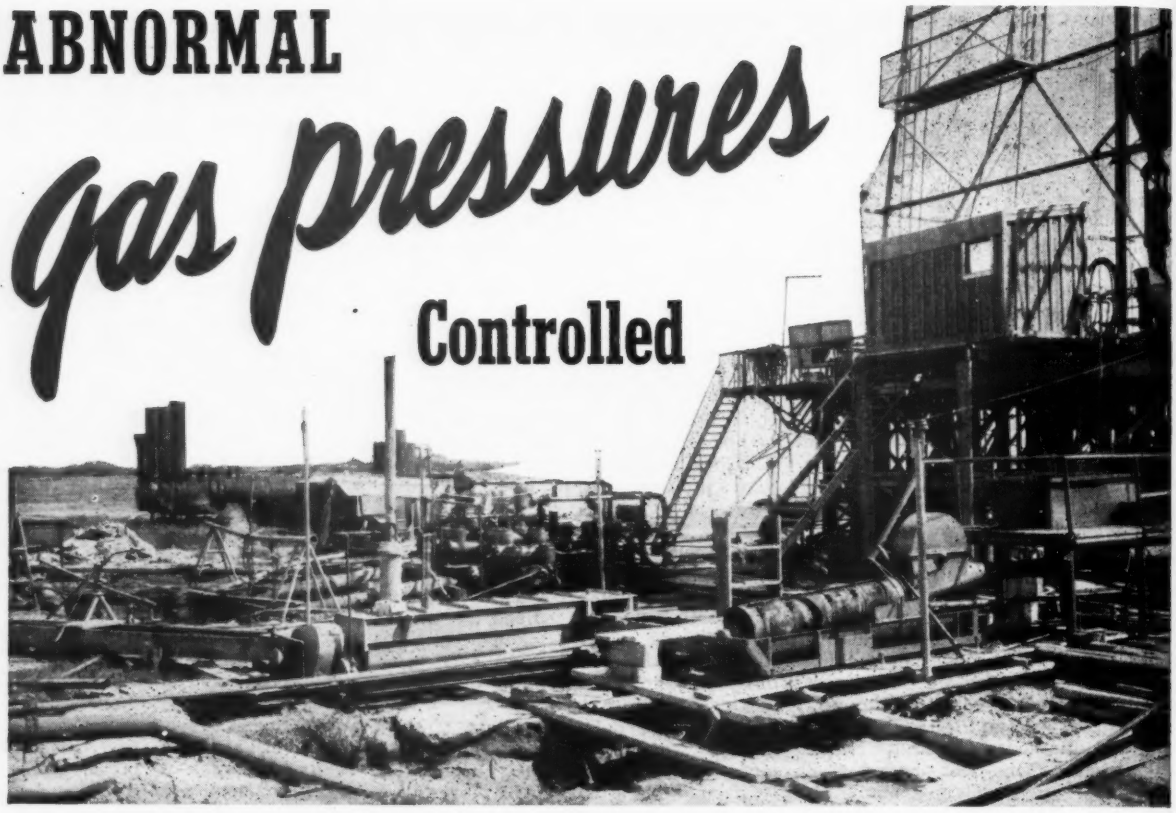
Williams told the committee WAA should condition all bids on obtaining a certificate from FPC but should not require a price substantially higher than the valuation FPC would place on the lines for rate-making purposes. His company has already applied to FPC for a certificate to operate big inch in gas service or alternately for a new line from Texas to New York, and now that his bid has been rejected he will prosecute this application.

A.I.M.E. Southern Section Schedules First Meeting

The newly organized southern section of the American Institute of Mining and Metallurgical Engineers will meet at the St. Charles Hotel in New Orleans, December 6, for its first technical program.

Speakers will be Dr. Norris Johnston, Magnolia Petroleum Co., Dallas and Los Angeles, who will present "Effect of Completion Practices on Productivity Indices," and Charles B. Carpenter, Bureau of Mines, Dallas, who will review the past year's developments in A.I.M.E.'s Petroleum Division.

ABNORMAL *gas pressures* Controlled



High pressures had been anticipated in drilling two South Texas wells, but not the 9,200 to 9,500-psi. pressures that were encountered. Sun Oil Co., the operator, adopted emergency measures in drilling the first well, and adapting what had been learned in drilling the second well the latter was completed without undue incident. Here is an account of the somewhat different drilling program that was formulated and carried through.

Mud-conditioning system on Sun Oil Co. 4 E. G. Canales. Facilities included a rotating shale shaker and sampling machine (right foreground) and vacuum-type degasser (center). At right of sampler, chemical feed box is mounted on mud-return line from well. Top of new marine-type, submerged rotating mud gun in suction pit is visible back of degasser and at left of pumps. Pumps include a 20-in. triplex and a 20-in. duplex for circulation, with an additional 14-in. pump (not shown) for mixing. The four 150-hp., 350-psi. working-pressure boilers are shown in the left background

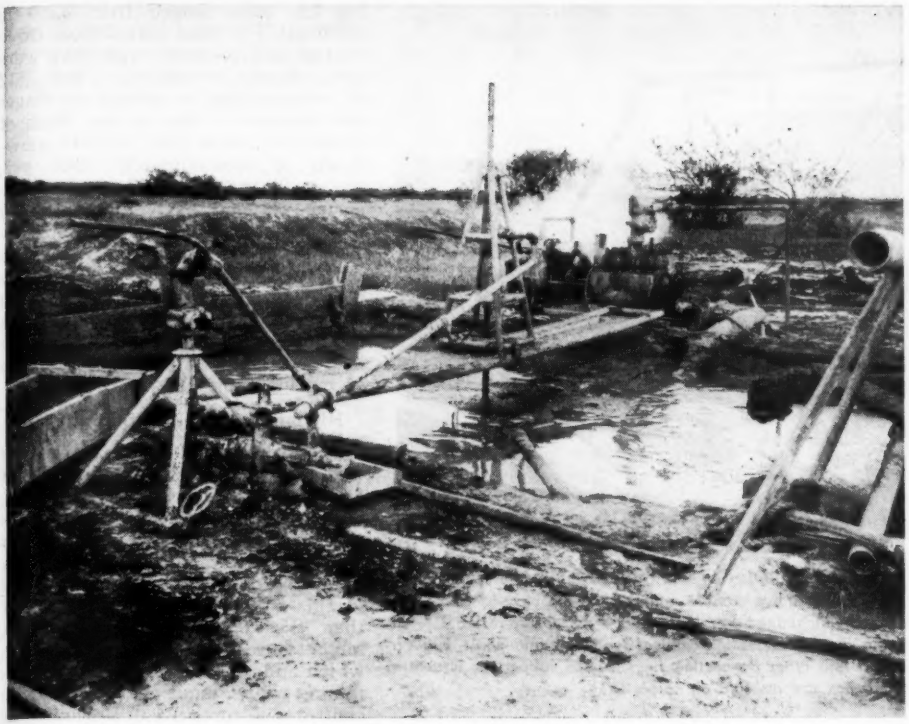
by Neil Williams

ABNORMAL gas pressures, estimated from 9,200 to 9,500 psi., encountered in sands at depths of from 9,500 to 11,000 ft., have been controlled successfully by Sun Oil Co. in the drilling of two South Texas wildcat wells, one in northeastern Brooks County and the other about 4 miles north in southwestern Kleberg County. The first, completed the latter part of August, was drilled to a total depth of 13,206 ft. The other, now in process of testing the various sands preparatory to completion, was stopped at 11,554 ft. Neither experienced any serious trouble other than that involved in the immediate problem of holding the pressures.

The Brooks County well, identified as 6 Sullivan, is located 660 ft. out of the northwest corner of the approximate 17,000-acre Sullivan ranch in the Loma Blanca Eltude Grant. This is about 7 miles east and 2 miles north of the town of Falfurias, and about 1½ miles northwest of the Sullivan pool, where five wells were drilled previously to shallower sands. The Kleberg County well, 4 E. G. Canales, 660 ft. out of the northwest corner of Section 336, in the E. G. Canales 3,293-acre tract, is about 1½ miles southeast of the Tijerina-Canales field and about 2¼ miles east of the Von Blucher field. The latter fields are linked with the Seeligson field and produce from shallower sands.

High pressures had been expected in drilling these wells but it was not anticipated they would be nearly as high as they were. Consequently, in drilling the first well (6 Sullivan) their control necessitated adoption of some emergency measures and procedure devised as the conditions arose. A further complication in this well was occasioned by the fact its drilling program originally was designed for a depth objective of only 10,000 ft. When mud weight had to be built up to control pressures, running of an extra protection string of casing had to be resorted to to prevent loss of circulation in the upper formations. This forced such a reduction in hole size for the deeper drilling that operations were greatly handicapped.

Knowledge of the excessive pressures and formational conditions gained in the first well prepared the



Marine-type, submerged mud gun installation in suction pit. Vertical 2-in. rotating shaft supported in A frame over center of pit has swivel connection from mixing pump discharge line. On bottom end of vertical shaft is 2-in. cross arm with T connection. Pump pressure circulating mud through vertical shaft to submerged cross arm and out series of jets rotates gun and insures thorough mixing of mud in pit

company for what to expect in the second well. Accordingly, a somewhat different drilling program was formulated for this well. Special practices were devised and extra precautions taken to insure maximum drilling control and safeguard the hole while negotiating the high-pressure zones. As a result, this well was drilled without undue incident and hole completed in a minimum of time, as compared with the first well.

High-Pressure Hookup

Drilling of the Sullivan well was started December 11, 1945. The program called for approximately 800 ft. of 13⅜-in. surface casing which was run in 18-in. hole carried open from the surface. In conventional practice, this was cemented to the top. Through it, 12¼-in. hole was drilled to 5,715 ft., where a 9⅝-in. intermediate protection string of pipe was cemented. Sufficient cement was circulated to place the top 2,500 ft. up the hole behind the pipe. Through this string, hole was reduced to 8⅝-in., with which size it originally had been planned to finish the well around 10,000 ft.

The drilling control and blowout-preventer assembly used on the 9⅝-in. string included two 10¾-in., 6,000-psi.-test Cameron Q.R.C. preventers with a 6,000-psi.-test Regan preventer on top. The bottom Cameron preventer was provided with blind rams and served as a master valve. The second contained fluid-operated rams for the 4¼-in. drill pipe. The Regan preventer permitted rotation under pressure. Height of the assembly necessitated the use of a 14-ft. substructure for the derrick and rig.

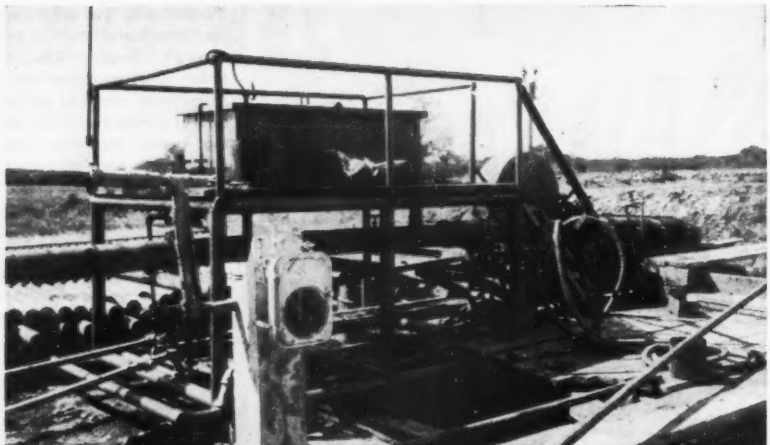
First abnormally high pressures were encountered around 9,625 ft. Drilling with 13.5-lb.-per-gal. mud, the hole began to "kick" and unload, and only by prompt action was a blowout averted. A gel-base mud weighted with Baroid and treated with quebracho and phosphates for viscosity and filtration control was being used. Additional Baroid was mixed and the mud weight brought up to 14.6 lb. per gal., but efforts to hold this weight resulted in breaking formations and loss of circulation. Large quantities of formation-sealing materials were added to the system in attempts to regain circulation and establish a weight balance. Unsuccessful in this after spending more than 2 weeks in the attempts, operators decided to try to run a string of 7-in. casing, and thus shut off the troublesome formations and permit building up mud weight for the remainder of the hole.

The string was run to bottom at 9,628 ft., and approximately 500 sacks of cement pumped around the shoe. No trouble was experienced although the entire job was accomplished without circulation. The surface control hook-up on this string was changed to include a 6-in. Cameron fluid-operated master valve; a 7-in., 10,000-psi. test Cameron Q.R.C. preventer with fluid-operated rams, for the drill pipe, and a 7-in., 6,000-psi. test Regan preventer on top for rotating under pressure. The string necessitated a reduction in hole size to 6⅛-in., and the 4½-in. drill pipe which had been used was replaced with a 3½-in. string.

Drilling under the 7-in. casing was started with 14.6-lb.-per-gal. mud. As in the 8⅝-in. hole, a gel-base mud was used. Water loss was held under 6.6 cc. Because of the use made of weighting materials, viscosity ran from 60 to 70 seconds. Weight was gradually built up by periodic additions of Baroid as drilling proceeded. At a depth of round 10,000 ft. it had been increased to 15.6 lb. per gal. A sand carrying much higher pressures than those of the 9,625-ft. sand in the 8⅝-in. hole was encountered at 10,159 ft., and it was necessary to build mud weight to 17.1 lb. per gal. to hold them. Below this, a succession of high-pressure sands was drilled to below 11,000 ft., and when the hole was finished at 13,206 ft., 17.3-lb.-per-gal. mud was being used.

Side-Wall Cores of All Sands

At the latter depth, the hole was still in good condtion, but in view of the relatively small size of the hole and the footage (3,578 ft.) that had been made in it, and the difficulties and hazards of working in such small hole at those depths under high pressures, it was decided to run casing and test the sands already encountered. The decision was further inspired by the fact that the lower formations had carried no promising sands. Sidewall cores were taken of all sands, and an electric-logging survey was made from bottom to



Continuous mud-weighing and recording installation on Sun's 4 Canales high-pressure well. Two-inch bypass from mud return line circulates sample mud stream through weighing device. Back of weighing machine is chemical feed box mounted on main mud-return line to rotating shale shaker and sampling machine (right). Chemical feed box and shale shaker, together with sections of mud return and other connecting lines within supporting structure for chemical box are unitized on single skid

complete the record of the hole. Accurate time-footage and sample records were kept during the drilling.

Streamlined 5-in. o.d. casing was run. This was set at 12,180 ft., where planned, and was run without difficulty despite the small clearance in 6⅛-in. hole. Special care had been taken to keep the hole as straight as possible. During drilling, deviation surveys were made at frequent intervals, and at no time was the hole more than ¼° off vertical. Approximately 250 sacks of cement were used. This was calculated to fill the annulus into the bottom of the 7-in. casing at 9,628 ft. The temperature bomb run after cementing indicated the top of the cement to be 9,620 ft., bearing out the previous calculations and indicating a good cement job. Maximum temperature inside the pipe was 266° F. at 12,180 ft. Maximum bottom-hole temperature was calculated to be 282° F., although previously it had been impossible to get the temperature bomb below 10,026 ft.

Perforations and Squeezing

Mud materials used in drilling the hole below the 9⅝-in. surface casing at 5,715 ft. totaled 1,812 sacks of colloids; 48,377 sacks of Baroid, and 17,535 lb. of chemicals (quebracho and phosphates).

Prior to perforating and testing the sands, a gamma-ray log was made to check the original electric log, and with a collar locator, collar points were carefully plotted as a means of insuring accuracy in measurements for perforating. First tests were made in a 10,475-ft. sand. Preparatory to these, to insure adequate and effective cement shutoff behind the pipe, the casing was perforated and cement squeezed both below and above the zone to be tested. Below the zone, the casing was perforated at 10,478-79 ft. with six holes, and, after a hook-wall packer test, 150 sacks of slow-set cement was squeezed with retainer at 10,460 ft. Above the zone, casing was perforated at 10,440-41 ft. and 100 sacks of slow-set cement containing 2 per cent Aquagel squeezed with retainer at 10,412 ft.

Additional Perforations, Completion

Casing then was perforated in the zone at 10,470-75 ft. with 24 holes, and a 2⅜-in., 4.7-lb. N. 80 tubing set with production packer. Production tests were made over a period of several days through various-sized chokes. On ¼-in. choke, the well flowed 2 to 2¼ million cubic feet of gas and about 50 bbl. of distillate daily at 2,200 psi. pressure. On ⅛-in. choke, pressure increased to 4,300 psi. The well was shut in only for brief periods to change chokes, but in these intervals the pressure quickly built up to 7,250 psi.

Concluding these tests, the well was killed with heavy mud and the perforations squeezed with cement. Casing then was perforated with 144 holes at 10,155-80 ft., and tubing rerun and set with production packer for tests of the upper sand. On potential test, the well flowed 102.2 bbl. of condensate with 7,560,000 cu. ft. of gas daily through ¼-in. choke on the tubing. Flowing pressures during the tests ranged from 3,300 to 3,800 psi. For final completion, three bottom-hole-pressure regulators were set at depths of 6,450, 4,875, and 3,512 ft., respectively, to reduce in stages the pressure at the surface. Each of these has a maximum pressure drawdown of approximately 1,500 psi., and with them the pressure at the surface ranged from 2,500 to 3,000 psi. The surface-control hookup consists of a 15,000-psi. tree, made up with two 3-in. master valves and a 3-in. cross with two 3¼-in. wing valves on each side. Since completion the latter part of August, the well has been shut in pending provision of production outlet.

Higher Pressures in Second Well

The second well (4 E. G. Canales) was started June 5. Total depth of 11,554 ft. was reached September 1, taking an over-all time of 119 days as compared with the 8½ months required by the Sullivan well in going to 13,206 ft. Pressures encountered in this well were somewhat greater than those in the first well. Also, temperatures were much higher, which added to the problem of maintaining proper mud characteristics to control the pressures. However, as reflected by the relatively good drilling time, the hole was made smoothly and with a minimum of interruption.

The drilling program followed in the Canales well differed substantially from that in the Sullivan well in two main details. First of these was in the amount of casing protection provided for the upper formations; and second, in the type of mud used in drilling the high pressure zones. Longer surface and intermediate casing strings were run. The surface 13⅜-in. casing was set at 1,506 ft. At this depth it insured a more secure anchorage and greater protection of the loose, unconsolidated surface formations from possible cratering in the event of a blowout. It was cemented to the top using 1,425 sacks of regular cement. As in the Sullivan well, 18-in. hole was drilled from the surface for this string with no conductor pipe being used. The 9⅝-in. intermediate string was set in 12¼-in. hole at 8,055 ft., 2,340 ft. lower than in the Sullivan well. It was cemented with 800 sacks of Starcor cement containing 3 per cent Aquagel, an amount calculated to place the top inside the surface string. With this longer intermediate string, which shut off most of the upper lower-pressure formations that had given trouble with lost circulation in the first well when mud weight was increased, the need of the extra 7-in. protection string that was set in the first well was eliminated. This made it possible to carry 8⅝-in. hole to the total depth, and thus facilitate drilling and pressure control in the lower part of the hole.

Well-control equipment on the 13⅜-casing for drilling the 12¼-in. hole consisted of a Cameron 13⅜-in., 6,000-psi.-test fluid-operated master valve, a Cameron S.D.A. 6,000-psi.-test intermediate preventer with hydraulic rams for the drill pipe, and a Regan 6,000-psi.-test preventer on top for rotating under pressure. The assembly for the 9⅝-in. casing was made up with a 10¾-in., 10,000-psi.-test Q.R.C. preventer with blind rams for the master valve, the same type preventer with fluid-operated rams for the drill pipe, and a 10,000-psi.-test Regan preventer on top for rotation.

Hole below the 9⅝-in. casing was drilled with a starch-base mud, replacing the gel-base mud that had been used through the upper formations. Some lime, and also some Aquagel, for colloidal material, were mixed with it, but essentially it contained only starch with Baroid being added along for weighting. Close conditioning control was maintained by chemical treatment, using largely phosphates and some quebracho.

Mud Control for Second Well

With the starch mud it was possible to reduce water loss to a maximum of 1.2 to 2 cc., which was held through the drilling, and at the same time carry from 1 to 1½ lb. per gal. additional weight with lower loss than with gel muds previously used. Also obtained were a lower gel and a greatly reduced viscosity which resulted in less friction loss and better pumpability, an important factor in providing adequate mud-pump volume and pressure capacity and reducing steam requirements. Viscosity was kept within range of 45 to 55 seconds as compared with 60 to 70 seconds built up with the gel mud in the Sullivan well. To prevent fermentation of the starch, it was necessary, however, to carry a relatively high pH, which ran from 11.6 to 12.5 as compared with 7.5 to 7.8 in the Sullivan well.

Drilling under the 9⅝-in. casing was started with a mud weight of 12.2 lb. per gal., which was gradually built up as drilling proceeded. At 9,000 ft., 13.6-lb. mud was being carried, and at 9,360 ft., where high-pressure sands began to be encountered, the weight was 14.8 lb. per gal. At the latter depth, with pipe out of the hole, the well started to slop over the top. Pipe was quickly started back in to circulate. Getting back only to 5,400 ft., pressure started to build up and reached 5,100 psi. when the kelly cock broke. Preventers were closed, and after repairs were made, 22-lb. mud was pumped to kill the well. Pipe then was run to bottom without further trouble and drilling resumed. Mud weight gradually was reduced to around 17 lb. per gal. Hole was finished with mud weighing 17.7 lb. per gal.

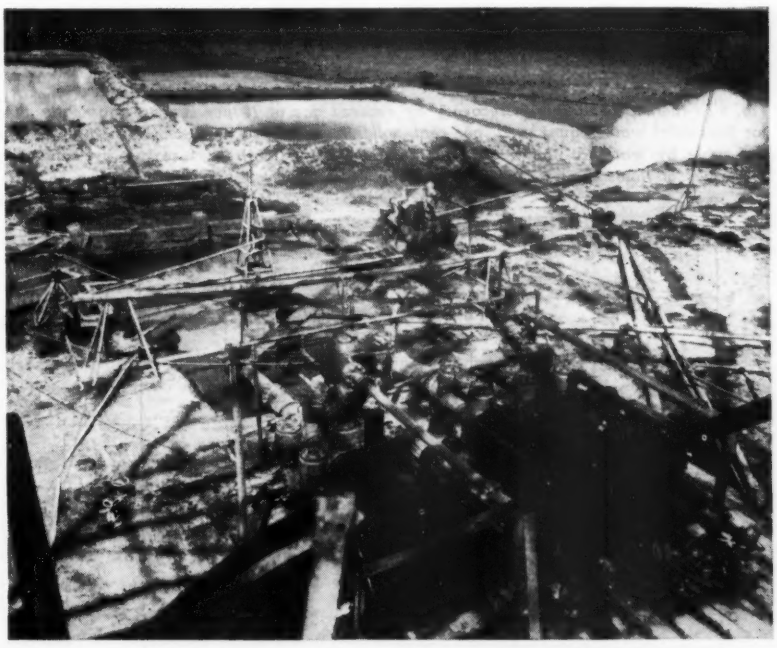
Mud materials used in the 8⅝-in. hole consisted of 24,000 50-lb. sacks of starch (Impermex), 21,074 sacks of Baroid, 499 100-lb. sacks of Aquagel, and 34,835 lb. of chemicals. In addition, there was a small amount of lime. No appreciable trouble was experienced with loss of circulation, and very little formation sealing material was required.

Completion Data for Second Well

Open hole below the 9⅝-in. casing to bottom totaled 3,499 ft. The drill string consisted of 4½-in. o.d. 16.16-lb. Grade E pipe with superstrength full-hole tool joints allowing unrestricted circulation. Circulating pressure through this pipe ranged from 1,350 to 1,450 psi. An important factor in the successful drilling and control of the pressures was the precaution taken to provide adequate reserve mud pump and steam capacity. For this the rig was equipped with a 20-in. triplex and a 20-in. duplex pump for mud circulation, an additional 14-in. duplex pump for mud mixing, and four 150-hp., 350-psi. working-pressure boilers for steam generation. A newly developed, marine-type, submerged mud gun with self-propelled rotating jet arms was installed in the suction pit to insure thorough mud mixing and the most effective utilization possible of the weighting material in building up mud weight.

Final casing consisted of a string of 5½-in. o.d. N-80 pipe which was set and cemented at 10,848 ft. It was run with 10 centralizers spaced 90 ft. apart from the bottom up in the 8⅝-in. hole. Approximately 1,000 sacks of Starcor slow-set cement was used for cementing. While cementing the pipe was worked up and down a length of 35 ft., a distance which overlapped and bypassed the collar points each time. This was done as a means of keeping the hole clean and forcing the cement uniformly up the annulus to avoid channeling. Working the pipe was continued even while pumping the plug. It took 43 minutes to get the plug down, and during this time the pipe was worked 29 minutes. Only during the last 14 minutes was the pipe stationary. The temperature bomb run in the pipe after cementing indicated the top of the cement to be at 7,250 ft., or 805 ft. inside the 9⅝-in. casing. Bottom-hole temperature was calculated at 308° F.

Casing was perforated first at 10,830-40 ft. with 40 shots in a stringer below the main sand. A string of 2⅜-in. o.d. J-55 tubing was set with the production packer, and on production tests through a ¼-in. choke, the well flowed 91 bbl. of distillate and 23 bbl. of water with approximately 3,000,000 cu. ft. of gas daily. Shut in it built up a maximum pressure of 7,800 psi. at the surface with an estimated 9,200 to 9,300 psi. bottom-hole pressure. Flow was killed with 17.6-lb. mud and 3,800 psi. of Halliburton pump pressure. Perforations in this sand were squeezed with cement and the casing reperforated at 10,805-15 ft., where additional tests are being made for completion.



Bird's-eye view from 14-ft. derrick substructure of two circulating pumps and mud-pit layout. Pump at right of suction pit is used for continuous mud mixing. Circulating pumps include 20-in. triplex pump (left) and a 20-in. duplex pump

Producing Rate by Expansion

by Park J. Jones*

OIL PRODUCTION by water

PART 5 OF A SERIES

THE cumulative oil recovery by expansion may range from 5-17 million barrels per 100 million barrels of oil in place. This recovery is available during the time reservoir pressure declines 15-25 per cent of the saturation pressure for oil. The rate of production by expansion varies with the rate of pressure decline and may be on the order of several thousand barrels per day. When oil is produced by expansion and water, the two producing methods interfere with each other. The oil produced by water cannot be produced by expansion and vice versa. This interference usually is not resolved in practice. Nevertheless, a breakdown for production by water and production by expansion is included here in order to illustrate the influence of declining pressures on producing rates and on ultimate recovery.

Availability of Recoverable Oil

THE oil displaced by evolved gas is available at the time reservoir pressure declines. On the other hand, the oil displaced by gas cannot be produced by water. So the oil produced by gas should be subtracted from the oil recoverable by water. This is from the viewpoint of reserves. But from the viewpoint of cumulative recovery at a given time, the oil accumulated by expansion should be added to the oil accumulated by water.

Free-gas saturation may be about 10 per cent of porosity for oil production by water. The cumulative oil recovery by gas at 10 per cent free-gas saturation is defined by:

$$U_g = \frac{100}{80 - F_s}\left(1 - \frac{b_s}{b}\,\frac{0.9 - W}{1 - W}\right) \quad (1)$$

where

- b = volume factor at 10 per cent free-gas saturation
- b_s = volume factor at saturation pressure
- F_s = fluid factor at saturation pressure
- W = interstitial water content
- U_g = cumulative oil recovery, fraction of recoverable oil $(80—F_s)$

The lines in Fig. 5-1 are solutions of Equation 1. The cumulative oil recovery at 10 per cent free-gas saturation may be anywhere from 5-17 per cent of the oil recoverable by water. If a reservoir contains 100 million barrels of oil recoverable by water, anywhere from 5 million up to 17 million barrels is available by the time free-gas saturation reaches 10 per cent of porosity. This recovery is over and above any oil production by water. The required pressure decline may be from 15 to 25 per cent of saturation pressure. The oil can be accumulated during the time pressure declines down to 85 or 75 per cent of saturation pressure.

*Production consultant. Houston.

Oil Recovery vs. Pressure

The relationship between pressure and oil recovery by expansion, for no water encroachment or injection, is defined[1] by:

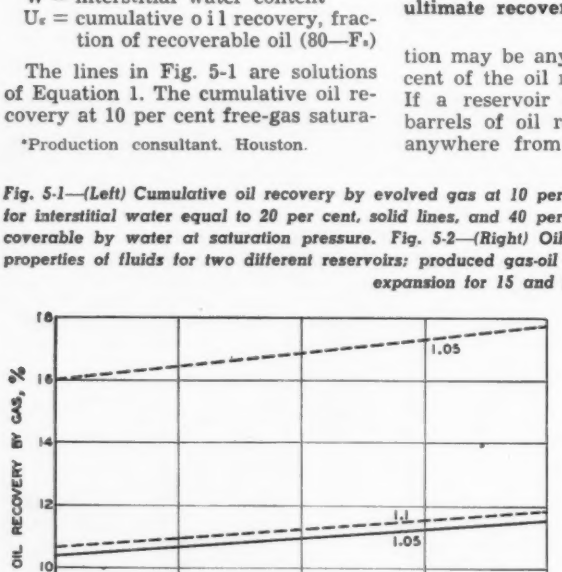
$$U_o = 100\left[1 - \frac{b_o}{b + B\,(G - g)}\right] \quad (2)$$

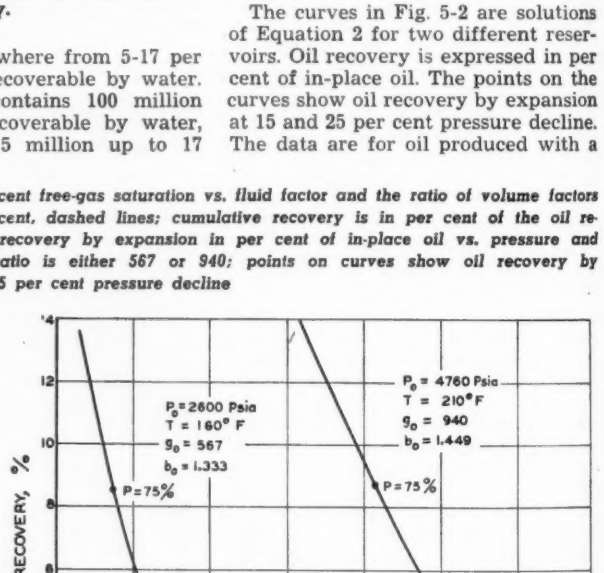
where

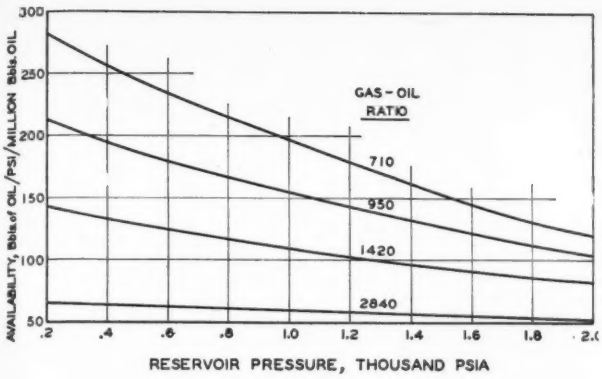
- b_o = volume factor at original pressure
- b = volume factor at pressure P
- g = gas in solution at pressure P, cubic feet per barrel of oil
- $(G—g)$ = free gas, cubic feet per barrel of oil
- B = $0.00504TZ/P$ = barrels of space occupied by free gas
- U_o = oil recovery by expansion, per cent of in-place oil

The curves in Fig. 5-2 are solutions of Equation 2 for two different reservoirs. Oil recovery is expressed in per cent of in-place oil. The points on the curves show oil recovery by expansion at 15 and 25 per cent pressure decline. The data are for oil produced with a

Fig. 5-1—(Left) Cumulative oil recovery by evolved gas at 10 per cent free-gas saturation vs. fluid factor and the ratio of volume factors for interstitial water equal to 20 per cent, solid lines, and 40 per cent, dashed lines; cumulative recovery is in per cent of the oil recoverable by water at saturation pressure. Fig. 5-2—(Right) Oil recovery by expansion in per cent of in-place oil vs. pressure and properties of fluids for two different reservoirs; produced gas-oil ratio is either 567 or 940; points on curves show oil recovery by expansion for 15 and 25 per cent pressure decline







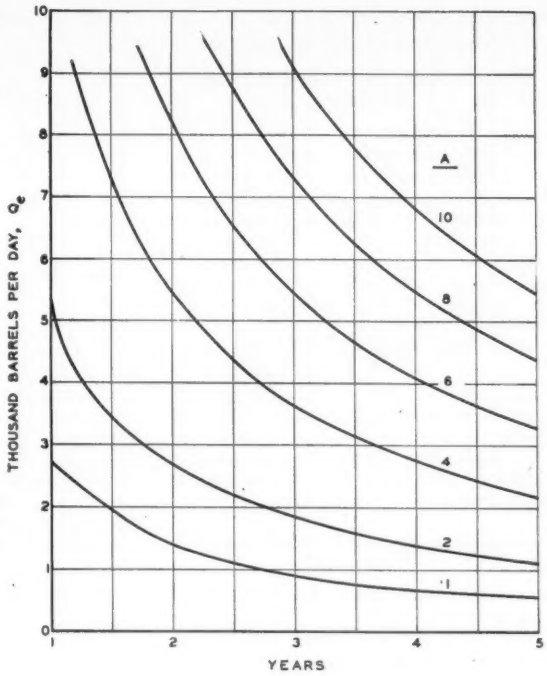


Fig. 5-3—(Above) Availability vs. pressure and produced gas-oil ratio for a particular reservoir: availability is barrels of oil per pound pressure decline per million barrels of oil initially in place. Fig. 5-4—(Right) Reservoir daily producing capacity by expansion vs. years required to decline pressure and availability A in million barrels

gas-oil ratio equal to that at saturation pressure.

Suppose a 15 per cent pressure decline in the 2,500-psia. reservoir resulted in equilibrium free-gas saturation. The minimum operating reservoir pressure would be 0.85 (2,500) or 2,125 psia. The oil recovery, by expansion alone, would be 4.3 million barrels per 100 million barrels of oil initially in place. Let the fluid factor F at 2,500 psia. be four. The recoverable oil would be 76 million barrels per 100 million barrels in place. Oil recovery would be 4.3/76 or about 5.7 per cent of the recoverable oil. The time required to accumulate the oil would be equal to the time during which reservoir pressure declined from 2,500 down to 2,125 psia.

Suppose a 25 per cent pressure decline in the 4,760-psia. reservoir resulted in equilibrium free-gas saturation. The minimum operating reservoir pressure would be 0.75 (4,760) or 3,570 psia. The oil recovery, by expansion alone, would be 8.6 million barrels per 100 million barrels of oil initially in place. Let the fluid factor at 4,760 psia. be two. The recoverable oil would be 78 million barrels per 100 million barrels in place. Oil recovery by expansion alone would be 8.6/78 or about 11.0 per cent of the recoverable oil. This oil could be accumulated during the time required to decline reservoir pressure from 4,760 down to 3,570 psia.

The Period of Development

The rate of pressure decline may increase during a period of development. Consequently, the producing capacity of a reservoir by expansion may increase. Suppose a reservoir can produce 10 million barrels of oil by expansion during the time reservoir pressure declines 15-25 per cent. The availability of oil, by expansion for a given gas-oil ratio, usually increases as pressure declines. Moreover, the rate of pressure decline is not uniform as a rule. For illustrative purposes, it is convenient to replace variable rates of production by uniform rates. For instance, if 10 million barrels are available and 5 years are required to decline the pressure, the corresponding uniform producing capacity of a reservoir by expansion is 2 million barrels per year.

More generally, the oil available by expansion relative to a declined pressure divided by a time interval is the equivalent producing capacity of a reservoir by expansion. The actual rate at a given time may be more, or less, than the uniform rate. But the accumulated recovery is the same at the time of no additional pressure decline.

Availability and Gas-Oil Ratios

Oil production by gas at pressures less than 75-85 per cent of saturation pressure usually causes increasing gas-oil ratios. The oil available per pound pressure decline drops off rapidly with an increase in the produced gas-oil ratio. The curves in Fig. 5-3 are an illustrative example. The data are for a particular reservoir. Availability is plotted against reservoir pressure for several gas-oil ratios.

Reservoir Capacity by Expansion

Let A equal the barrels of oil available by expansion down to equilibrium free-gas saturation, that is, for a 15-25 per cent pressure decline below saturation pressure. Let y equal the number of years required to decline reservoir pressure. The reservoir daily average producing capacity Q_e is given by:

$$Q_e = \frac{A}{365\ y} \qquad (3)$$

The curves in Fig. 5-4 are solutions of Equation 3. Reservoir producing capacity, in barrels of oil per day, is plotted against the number of years required to decline reservoir pressure. Availability ranges from 1-10 million barrels. The data are aside from any production by water. Well capacity is not considered. A reservoir is said to have a producing capacity by expansion, or by water, even if no wells are drilled. We might note that a 2-4 thousand daily reservoir producing capacity by expansion alone during the first 2 or 3 years in the life of 100-million-barrel reservoirs is not unusual.

The Equivalent Life

Let Q equal the rate of production from a reservoir by expansion in barrels per day. The equivalent life y_e is defined by:

$$y_e = \frac{A}{365\ Q} \qquad (4)$$

where A is the availability for a reservoir. The curves in Fig. 5-5 are solutions of Equation 4. A reservoir may continue producing oil by expansion for many years, depending on the rate of production by expansion and on availability. The first 3-10 million

barrels cumulative oil recovery may be produced primarily by expansion.

Interference Between Water and Expansion

The producing capacity of a reservoir by expansion varies with the rate of pressure decline and with the barrels of oil in place. However, the oil produced by expansion cannot be produced by water. Conversely, the oil produced by water cannot be produced by expansion. Simultaneous production by expansion and water causes interference.

The producing capacity of reservoirs by water will be illustrated in later articles for various structural and stratigraphic conditions. At this point we wish to indicate a procedure for estimating cumulative oil recovery for producing oil by expansion and water simultaneously.

Cumulative Recovery by Water and Expansion

Let the oil recoverable by maintaining pressure with water be 100 per cent. This is the reserve producible by water for no decline in pressure. Denote the time required to accumulate the reserve by 100 per cent. The 100 per cent time may be any number of years such as 20, 40 or 60. Assume for the present purposes that the cumulative oil recovery at any time for maintaining the original pressure with water is some curve such as W_o in Fig. 5-6.

On the other hand, suppose reservoir pressure could be declined 15-25 per cent below saturation pressure without loss of reserve. Let the oil available by expansion be 10 per cent of the reserve. Let the cumulative oil recovery by expansion alone be the E_o line in Fig. 5-6. Cumulative recovery curves for expansion usually are convex upward. The asumed line is for illustrative purposes only.

Table 5-1 illustrates a procedure for estimating cumulative oil recovery for simultaneous production by expansion and water. The first column is time in per cent of the life of a reservoir. The second column shows what the cumulative recovery would be for no expansion. The third column, ΔW_o, shows cumulative recovery for 10 per cent time intervals. The column headed by E_o shows what the cumulative recovery would be for no production by water.

TABLE 5-1—EXAMPLE ON CUMULATIVE RECOVERY BY EXPANSION AND WATER*

Time	W_o	ΔW_o	E_o	CE	ΔE	E	CW	ΔW	W	W + E
0	..	..	..	100	..	..	100	..	..	..
10	19	19	5	81	4.5	4.5	95	18.5	18.5	23.0
20	36	17	10	64	3.6	8.1	90	15.7	34.2	42.3
30	51	15	..	..	..	..	90	13.5	47.7	55.8
40	64	13	..	..	..	..	90	11.7	59.4	67.5
50	75	11	..	..	..	..	90	9.9	69.3	77.4
60	84	9	..	..	..	..	90	8.1	77.4	85.5
70	91	7	..	..	..	..	90	6.3	83.7	91.8
80	96	5	..	..	..	..	90	4.5	88.2	96.3
90	99	3	..	..	..	..	90	2.7	90.9	99.0
100	100	1	..	..	..	..	90	0.9	91.8	99.9

*See Fig. 5-6 and text for symbols.

The column headed CE gives the correction to be applied to expansion because of oil production by water. At zero time the availability is 100 per cent. At 10 per cent time, 19 per cent of the reserve would have been produced by water aside from expansion. The availability is (100 — 19) or 81 per cent. The availability averaged (100 + 81)/2 or 90.5 per cent for the first 10 per cent time interval. So the corrected accumulation by expansion is taken at 5 (0.905) or 4.5 per cent of the reserve. The latter is listed in the column headed ΔE.

At 20 per cent time, 36 per cent of the reserve would have been produced by water aside from expansion. The availability during the second 10 per cent time interval decreases from 81 down to 64 per cent. The availability averages 72.5 per cent. So the corrected accumulation by expansion is taken at 5 (0.725) or 3.6.

The estimated cumulative recovery by expansion is 8.1 per cent. Whereas, for no water production, the cumulative recovery would have been 10 per cent. The interference of water on expansion for this example is (10 — 8.1) or 1.9 per cent. As the oil not recoverable by water also expands, the estimated recovery by expansion is on the low side. The influence of the oil not recoverable by water on cumulative recovery by expansion is nominal in the present example. However, expansion of the oil not recoverable by water should be included if the pressure decline is significantly more than 15-25 per cent

(Continued on page 93)

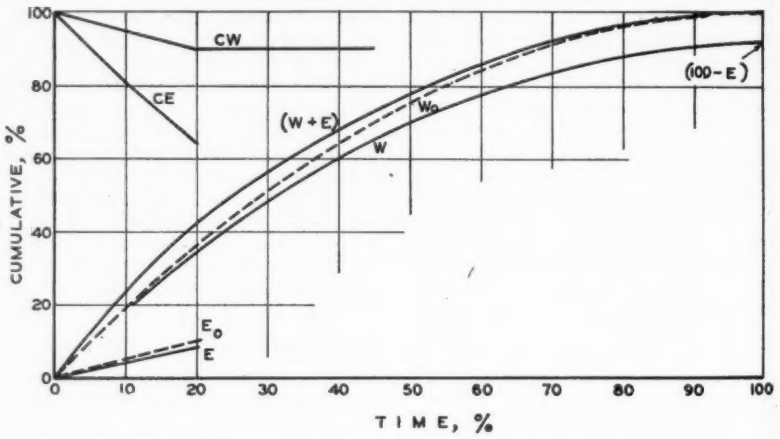


Fig. 5-6—(Above) Illustrating a procedure for estimating cumulative oil recovery by expansion and by water: W_o is cumulative recovery by water for no pressure decline; E_o is cumulative recovery by expansion for no production by water; E is cumulative recovery by expansion corrected for production by water; W is cumulative recovery by water corrected for production by expansion; CE and CW are correction factors (see Table 5-1)

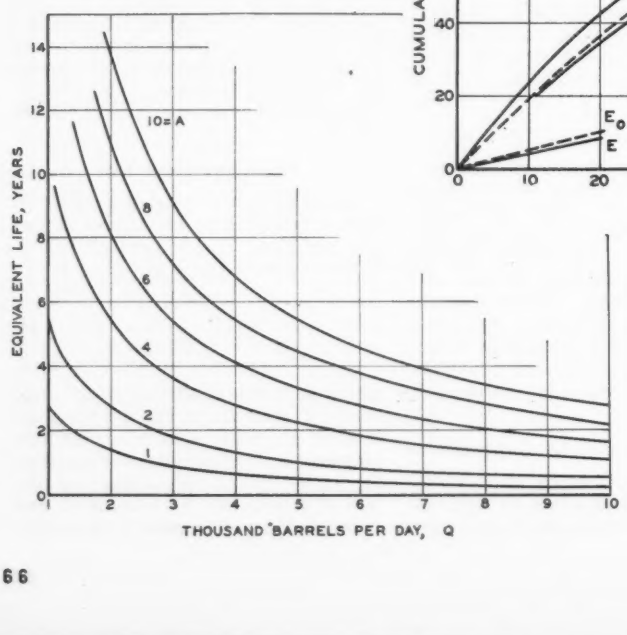


Fig. 5-5—(Left) Years required to accumulate A million barrels of oil at a uniform producing rate Q

BLOCKS that really TRAVEL

The instant the brakes are released, Bethlehem streamlined traveling blocks zip into action.

Study These outstanding features

- **Each size matched with companion crown block**
- **Interchangeable sheaves and bearings**
- **Single-pin construction**
- **Streamlined—no projecting nuts or lugs**
- **Narrowness combined with strength**
- **Individual bearing lubrication from central point**
- **Ground wire-rope grooves**
- **100% roller bearing**
- **Self-supporting; stand upright on the floor**
- **Self-stringing; built-in guides permit stringing block without removing guards**

For more details, call our nearest office or store.

534-30— 80 tons capacity
7-36—125 tons capacity
A-250—250 tons capacity
A-350—350 tons capacity

BETHLEHEM STEEL

BETHLEHEM SUPPLY COMPANY

Subsidiary of Bethlehem Steel Corporation

Bethlehem Supply Offices or Stores: **Arkansas**—Magnolia; **Colorado**—Craig, *Denver; **Illinois**—Grayville, Mattoon, Salem; **Kansas**—Chase, El Dorado, Great Bend, Pratt, Russell, *Wichita; **Louisiana**—Eunice, Harvey, Houma, Lake Charles, New Iberia, Shreveport; **Mississippi**—Laurel; **New Mexico**—Artesia, Hobbs; **Oklahoma**—*Bartlesville, Lindsay, Oklahoma City, *Ponca City, Seminole, *Tulsa, Wewoka; **Texas**—Alice, Beaumont, Borger, Bowie, Carthage, Corpus Christi, *Corsicana, *Dallas, *Fort Worth, Graham, Houston, Kermit, Kilgore, La Ward, McAllen, Odessa, Pampa, *San Antonio, Sundown, Wichita Falls, Winnsboro; **Wyoming**— *Casper. (** Office only.*)

IMPROVED Maintenance AND Operating Methods OF MAGNOLIA PIPE LINE

by Paul Reed

IN the progressive improvement of methods for safeguarding and prolonging the life of equipment, the staff of Magnolia Pipe Line Co. has developed practices at the Corsicana maintenance shops and pipe-line terminal. The Corsicana facilities are located at a strategic junction on the company's system where crude oil is received from the West, North and East for movements north to Fort Worth and south to the Gulf Coast. Several of the recent advances in Magnolia's procedures are presented here.

Salvaging Reciprocating Pump Plungers

BECAUSE comparatively few attempts have been made by pipe-line organizations to metalize cast-iron pump plungers the results obtained by Magnolia's Corsicana shops are of special interest.

Ten 6-in. pump plungers, metalized with a nickel-steel wire, designated as Metco No. 2, have been performing satisfactorily in regular service for more than 6 months. Salvaging worn plungers in this manner costs less than replacements. The sprayed metal is of an open-grain nature; it is less affected by corrosion and harder than the original cast iron.

One of the problems of such metalizing was to devise a method for "bonderizing" or anchoring the sprayed metal so that crude oil being pumped at working pressures would not penetrate where it could "blister" or "flake" sprayed metal away from cast-iron plunger.

After experimenting with two or three types of anchorage threading, it was discovered that a No. 12 thread, somewhat coarser than used for metalizing on steel, gave best results. It was found that a No. 12 square thread with slightly rounded roots would not crumble.

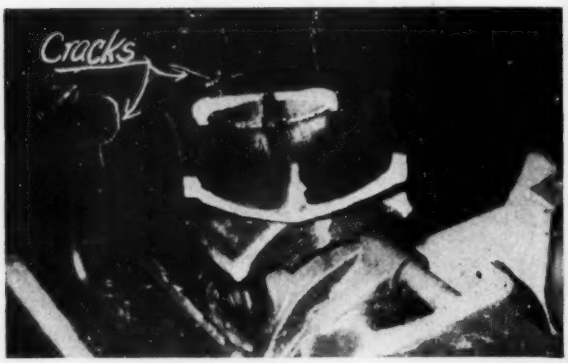
Before threading, the plunger surface to be metalized was machined so that the plunger was 3/64 in. smaller than the original diameter. Careful cleaning with carbon tetrachloride removed all traces of oil from the cast iron.

After threading, a metalized coating was sprayed over the plunger. Suggestions to use two metalizing materials were rejected and only one material—No. 2 Metco—was used. After metalizing, it was necessary to machine with a Carboloy tool; otherwise it is doubtful whether the metalized metal could have been machined. Such machining saved time in final grinding.

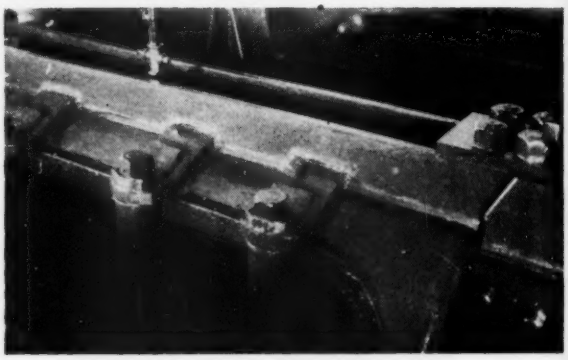
Time for salvaging a single plunger was 3 hours for machining, 8 for metalizing, and 3 to 4 for grinding.

Pump Crosshead Slide Repaired with Clamp

A BROKEN pump crosshead slide at a main-line station was repaired by use of a clamp fabricated at the Corsicana shops. The repair clamp serves both as reinforcing for the actual slide as well as reinforcing to withstand the stresses imposed by the working load of the fluid end.



Broken pump crosshead slide before repairing



Same pump operating satisfactorily with clamp after repairing

In carrying out this repair of the broken crosshead slides, the broken pieces and the slide member which was bent upward were forced back to approximately normal position with soft hammers and the aid of a hydraulic jack.

Round disks were machined on correct diameters to serve as positive gages to function as temporary repair fixtures in the place of the crosshead and assembled shoes.

Next, the steel fabricated repair clamp was placed in position. Holes were drilled for retaining studs and bolts. Then the repair clamp was drawn down so as to pull broken parts into their former position in perfect alignment.

Ribs and other parts of the repair clamp were fabricated entirely from war salvage 1½-in. to 2-in. armorplate steel.

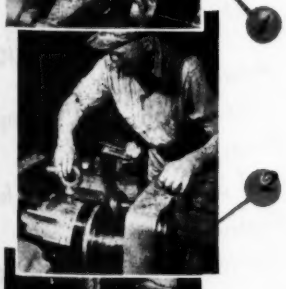
Jig for Flame Cutting

A MACHINE for making straight as well as circular cuts has been developed at the Corsicana shops. This has been built on principles different from those of most commercial machines. War restriction and scarcity fostered the building of this machine.

For circular cutting, the machine travels on a circular track cut from irregular-shaped steel-plate stock.

Quick Ram Change

CAMERON'S LARGEST SIZE "QRC" PREVENTER—18 INCH—REQUIRES ONLY A FEW MINUTES TO CHANGE RAMS!



Unlike earlier models of Cameron Blowout Preventers in which the ram change operation became more difficult as the size of the preventer increased, the rams of *all* sizes of the new Cameron Type "QRC" Pressure-Operated Blowout Preventer can be *changed in a matter of minutes*. No special tools are required and even inexperienced drilling crews can do the job quickly and easily. (1) Remove 4 coarse thread wing nuts on each end of the preventer. A few firm taps with a hammer spins them off. (2) Turn the fluid pressure operation control valve to "open" position to withdraw rams from preventer body. (3) Screw lifting eye into top of each ram and pick up with a catline. Insert new rams and reverse operation.

Other outstanding features of the "QRC" are: 8 to 1 ratio of closing pressure to well pressure as compared to 3 to 1 on earlier models; 10,000 lb. test models in 6", 8" and 10" sizes; patented self-feeding ram packing element which permits pipe movement and/or rotation through the closed rams while heavy mud is circulated to subdue "kicking" pressures; less bulk and weight—lower overall height; and other proven features.

Complete details will gladly be sent to interested operators on request.

SPECIFICATIONS

SIZE	SERIES	VERTICAL BORE	RAM SIZES	WIDTH	LENGTH	HEIGHT	WEIGHT, LBS.
16"	600	16¾"	Blind thru 13⅝"	53¾"	137"	40"	14,600
18"	600	17¾"	Blind thru 13⅝"	53¾"	137"	40½"	14,610

CAMERON IRON WORKS, INC.

P. O. BOX 1212, HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y. West Texas: Odessa (Telephone 1710). Oklahoma: 310 Thompson Bldg., Tulsa. California: 1442 Hayes Ave., Long Beach (7-2036). Wyoming, Casper. North Louisiana: Bossier City (P. O. Box 425).

THIS RIG SATISFIES THEM ALL

This 5,000-foot Model S draw works is fast, dependable and rugged—just the rig your crews need for drilling and work-over jobs.

Drillers like the "Hi-Lo" drum drive, five-speed, even-step transmission and fully equalized brakes. Toolpushers like the way it makes hole and handles pipe. Contractors are really satisfied because there's profit left when the job is done—more profit per hour, less time per well. The producer who pays the bill likes it too, for his well cost is lower.

From every viewpoint—fast operation, low-cost maintenance and minimum transportation costs, you'll find this Model S draw works the most satisfactory rig of its capacity. Write for complete information and prices.

Brief Specification

Available with single engine up to 202 H.P.

Drum capacity, 10,700 feet of 3/4" line.

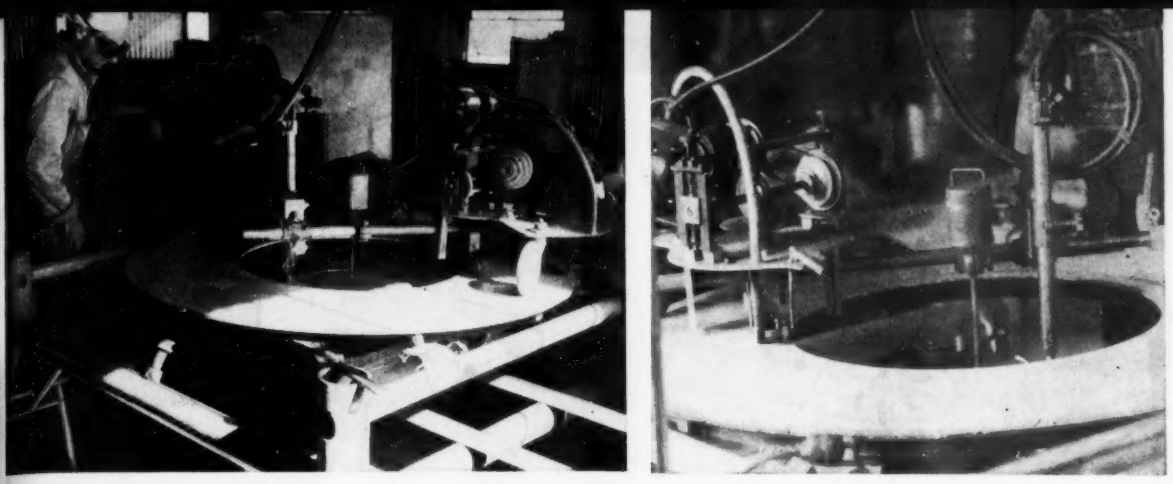
Effective brake area, 2,160 sq. in.

Net weight with 202 H.P. engine, 20,500 pounds.

CARDWELL ALL STEEL
THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

CARDWELL MFG. CO. INC.
FORMERLY ALLSTEEL PRODUCTS MFG. CO.
P. O. Drawer 2001 - Cable Addresses: "ALLSTEEL" WICHITA - "CARDSTEEL" NEW YORK
Wichita, Kansas, U. S. A.

"CARDWELL" RIGS LAST LONGER AND REQUIRE FEWER REPAIRS



Jig for flame cutting operating on a circular track

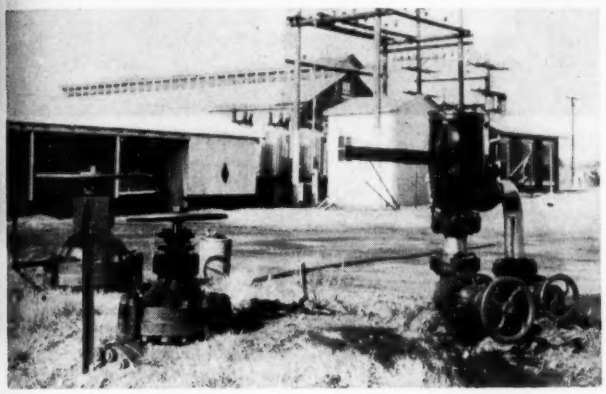
There is a central circular open space. Any material may be cut if placed in a position below the circular track. The machine travels in a fixed circular course which is entirely separated from the material being cut.

For straight cutting, the machine is placed on a straight track built for this machine. For circular or straight cutting no templates are used. Although the machine is separate from the material being cut it functions as though it were directly on it.

During circular cutting, the torch is fixed at a desired position on a tram arm centered at a fixed point on the material being cut, and attached to the carriage of the machine traveling on the circular track. The carriage of the machine is a tricycle device on three casters, operated by an electric motor.

Any diameter may be readily cut without pattern or guide; consequently time is saved. The torch may be quickly adjusted at the beginning of a job and the cutting operation may be started without delay. Cutting is rapidly done.

When cutting in a straight direction, the wheels are locked in position while they run in straight tracks. An advantage of the machine is the accuracy attained with little effort and time given to preliminary adjustment.



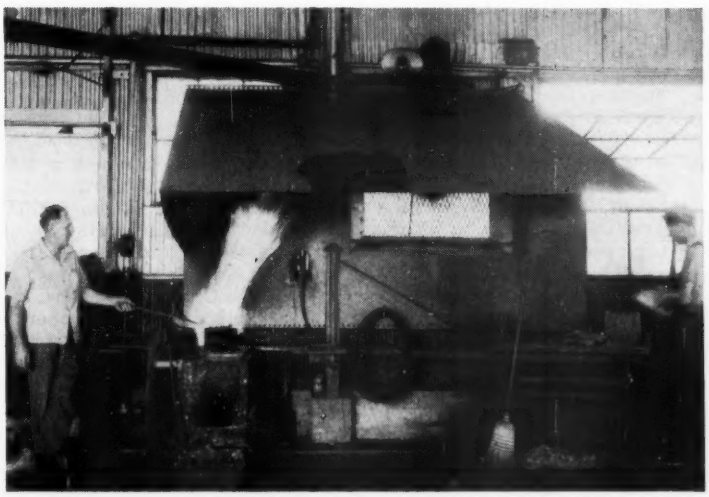
Relief Valve at Low Pressure End of Line

IN addition to the high-pressure relief valves placed near the discharge at the pump station, Magnolia has found it advantageous to place low-pressure relief valves at the delivery end.

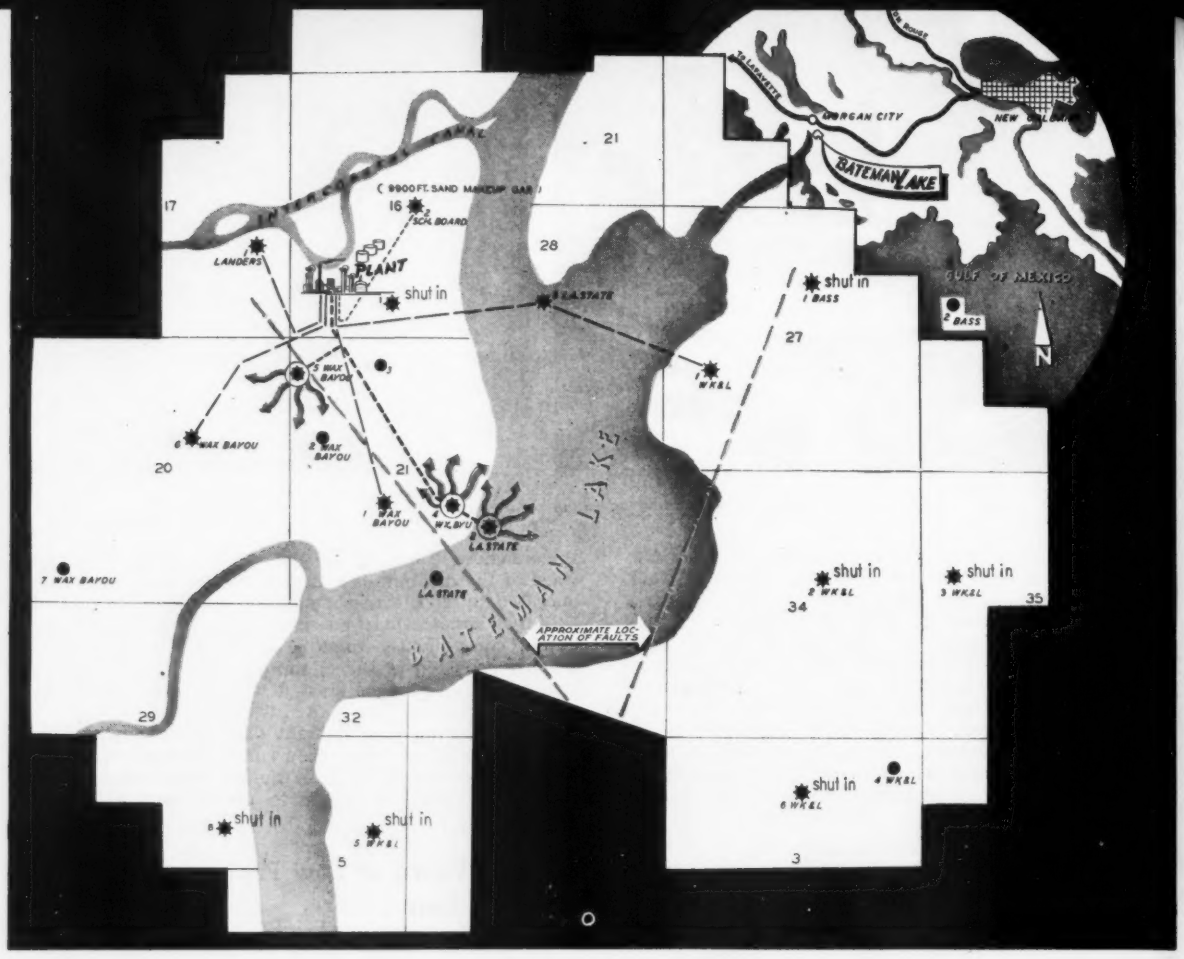
Photograph shows a relief valve installation on the line through which crude oil from Kilgore is received at the Corsicana station. The relief valve as it is installed without weights remains closed when pressure in the line is not higher than approximately 80 psi. The advantage of the low-pressure relief valve is to safeguard the Kilgore-Corsicana line on the low-pressure end.

Exhaust Fan for Babbitting Shop

BABBITTING-SHOP conditions have been improved by the simple and effective installation of a 42-in. fan operated by a ½-hp. electric motor in the upper part of the hood. The fan pulls the smoke off of the work and out of the room without an eddy. This is particularly advantageous when there are dense fumes arising from the thinning compound. Since the workmen are never in smoke, it is possible to carry on the variety of work in the babbitt shop to better advantage. The shop makes a practice of using resin to do a thorough job of cleaning babbitt.



Exhaust fan pulls fumes from babbitting operation so as to improve working conditions



BATEMAN FIELD *Cycling Operations*

by Neil Williams

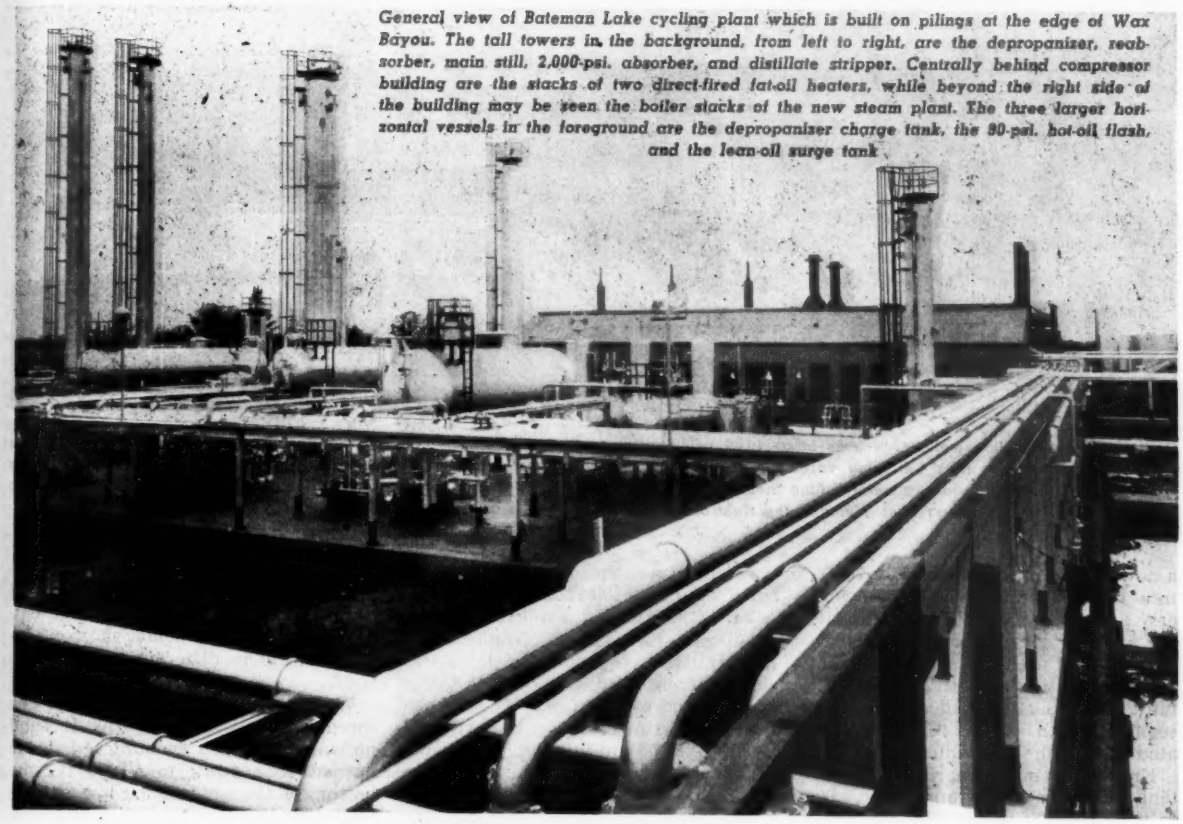
CYCLING operations in The Texas Co.'s Bateman Lake field in St. Mary's Parish, central Louisiana, recently have been extended by the installation of new plant facilities boosting the volume of gas handled to 70,000,000 cu. ft. daily. Of this capacity, 40,000,000 cu. ft. is provided by the new plant and 30,000,000 cu. ft. by utilization of existing compressor and absorption equipment of the original plant.

Plant operation is designed to obtain a final product consisting of a stabilized condensate, recovering all hydrocarbons up to and including 80 to 85 per cent of the butanes. On the basis of current gas throughput, the output totals from 73,000 to 75,000 gal. daily. This includes 15,000 to 16,000 gal. daily of raw product recovered in the absorption system of the original plant which is combined with the raw product from the new plant for depropanizing at the latter plant. All liquid recovery is pumped, commingled with the field's crude production, to pipe-line outlet. The pipe line each day runs over a 23-hour period the entire plant output of the preceding day in a volume ratio of approximately 7 bbl. of plant production to 1 bbl. of crude.

The field is situated in the southeastern part of Township 16s-12e about 3½ miles at its northern limits down the Atchafalaya River from Morgan City and Berwick, located on opposite sides of the river, 90 miles southwest of New Orleans. It lies entirely within low-lying marshes bordering both sides of Bateman Lake, a widened stretch of the river from which it derives its name. Access is exclusively by water by way of this river and through the system of natural and dredged canals which traverse the field.

Elevation is only from 3 to 7 ft. above sea level, and during most of the year the marsh is entirely covered with water by overflow from the river and encroaching tides. Even at other times the surface remains wet and boggy, with soft mud extending to a depth of more than 15 ft. For this reason the entire plant is supported above high-water level on a piling foundation, capped with reinforced concrete which provides a continuous flooring over the site. Under main loads, 60 to 65-ft. creosoted piles with 14-in. butts and 8-in. tips were driven in triangles of three piles with 4-ft. centers giving a load factor of 10.15 tons per pile.

Site of the plant is in the north end of the field on Little Wax Bayou, a part of the field canal system. The new plant facilities were designed and installed by Fluor Corp., which built a shop and loading dock on the west bank of Atchafalaya River at Berwick, where the piping was prefabricated. From there it was trans-

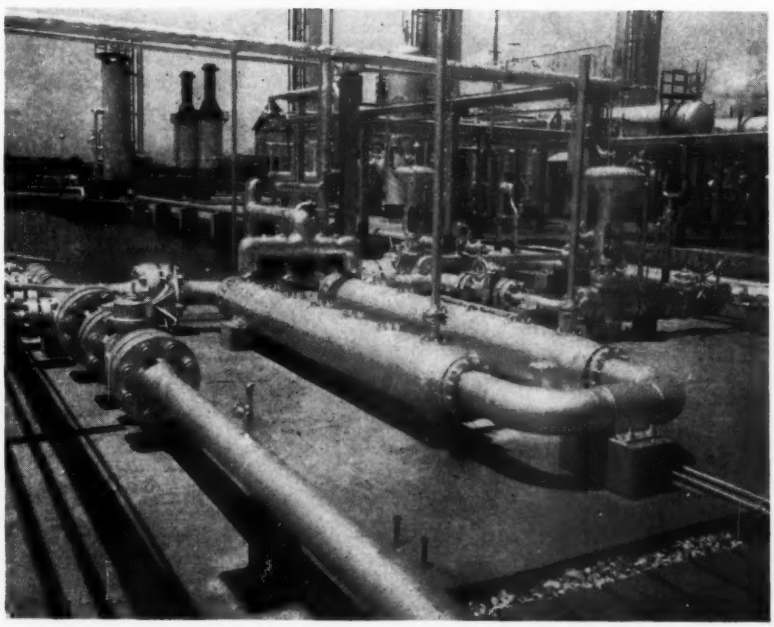


General view of Bateman Lake cycling plant which is built on pilings at the edge of Wax Bayou. The tall towers in the background, from left to right, are the depropanizer, reabsorber, main still, 2,000-psi. absorber, and distillate stripper. Centrally behind compressor building are the stacks of two direct-fired fat-oil heaters, while beyond the right side of the building may be seen the boiler stacks of the new steam plant. The three larger horizontal vessels in the foreground are the depropanizer charge tank, the 90-psi. hot-oil flash, and the lean-oil surge tank

MORE THAN *Doubled* BY NEW PLANT FACILITIES

ported by barges direct to the plant site. Since the original plant is at the front of the site on the bayou side, a canal was dredged from the bayou around one side and the back of the site so that barges could be unloaded at places convenient for the installation of the equipment.

Bateman Lake is a multiple-reservoir field overlying a domal-shaped structure, indicated to be a deeply seated salt plug, and embracing an area of from 3 to 3½ miles in diameter. Its dominant structural feature and one of the controlling factors in the cycling program undertaken is a sizable graben formed by two major converging faults. From the point of near convergence in the south part of the field, one fault, having



Wet gas to plant passes through this inlet pressure-control installation. In foreground are two jacketed-type steam heaters on 8-in. inlet header while installed beyond them are two large pressure-reducing regulators

One of the gas-injection wells. Gas goes in at 4,700 psi. Starting at the extreme left can be seen the 4-in. high-pressure injection line to the well, then there is a 4-in. plug valve for positive gas shutoff, a mist extractor for removal of any lubricating oil, a globe valve for volume regulation, the orifice-meter setting (housed), a piston-type check valve to prevent back flow, then the 4-in. swing valve to tubing inlet. Meter to the right of the christmas tree is a temporary "check" meter setting

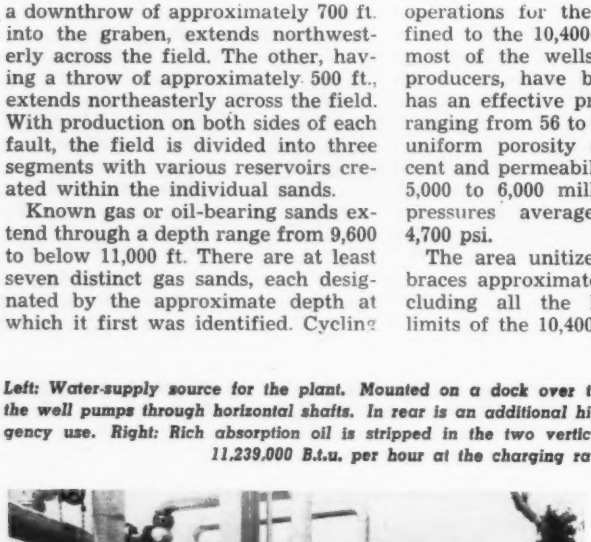
a downthrow of approximately 700 ft. into the graben, extends northwesterly across the field. The other, having a throw of approximately 500 ft., extends northeasterly across the field. With production on both sides of each fault, the field is divided into three segments with various reservoirs created within the individual sands.

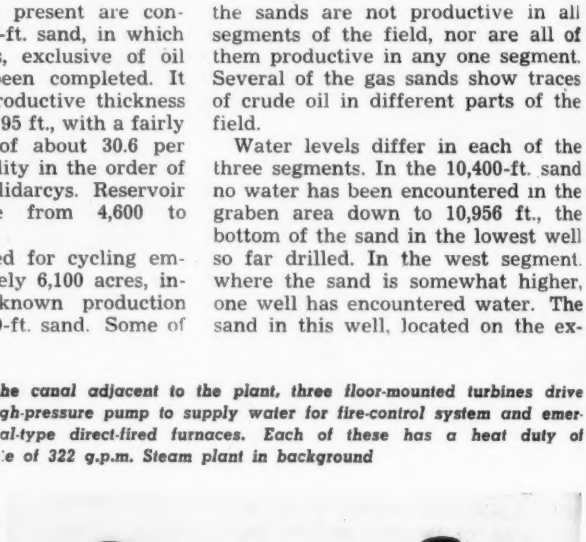
Known gas or oil-bearing sands extend through a depth range from 9,600 to below 11,000 ft. There are at least seven distinct gas sands, each designated by the approximate depth at which it first was identified. Cycling operations for the present are confined to the 10,400-ft. sand, in which most of the wells, exclusive of oil producers, have been completed. It has an effective productive thickness ranging from 56 to 95 ft., with a fairly uniform porosity of about 30.6 per cent and permeability in the order of 5,000 to 6,000 millidarcys. Reservoir pressures average from 4,600 to 4,700 psi.

The area unitized for cycling embraces approximately 6,100 acres, including all the known production limits of the 10,400-ft. sand. Some of the sands are not productive in all segments of the field, nor are all of them productive in any one segment. Several of the gas sands show traces of crude oil in different parts of the field.

Water levels differ in each of the three segments. In the 10,400-ft. sand no water has been encountered in the graben area down to 10,956 ft., the bottom of the sand in the lowest well so far drilled. In the west segment, where the sand is somewhat higher, one well has encountered water. The sand in this well, located on the ex-

Left: Water-supply source for the plant. Mounted on a dock over the canal adjacent to the plant, three floor-mounted turbines drive the well pumps through horizontal shafts. In rear is an additional high-pressure pump to supply water for fire-control system and emergency use. Right: Rich absorption oil is stripped in the two vertical-type direct-fired furnaces. Each of these has a heat duty of 11,239,000 B.t.u. per hour at the charging rate of 322 g.p.m. Steam plant in background



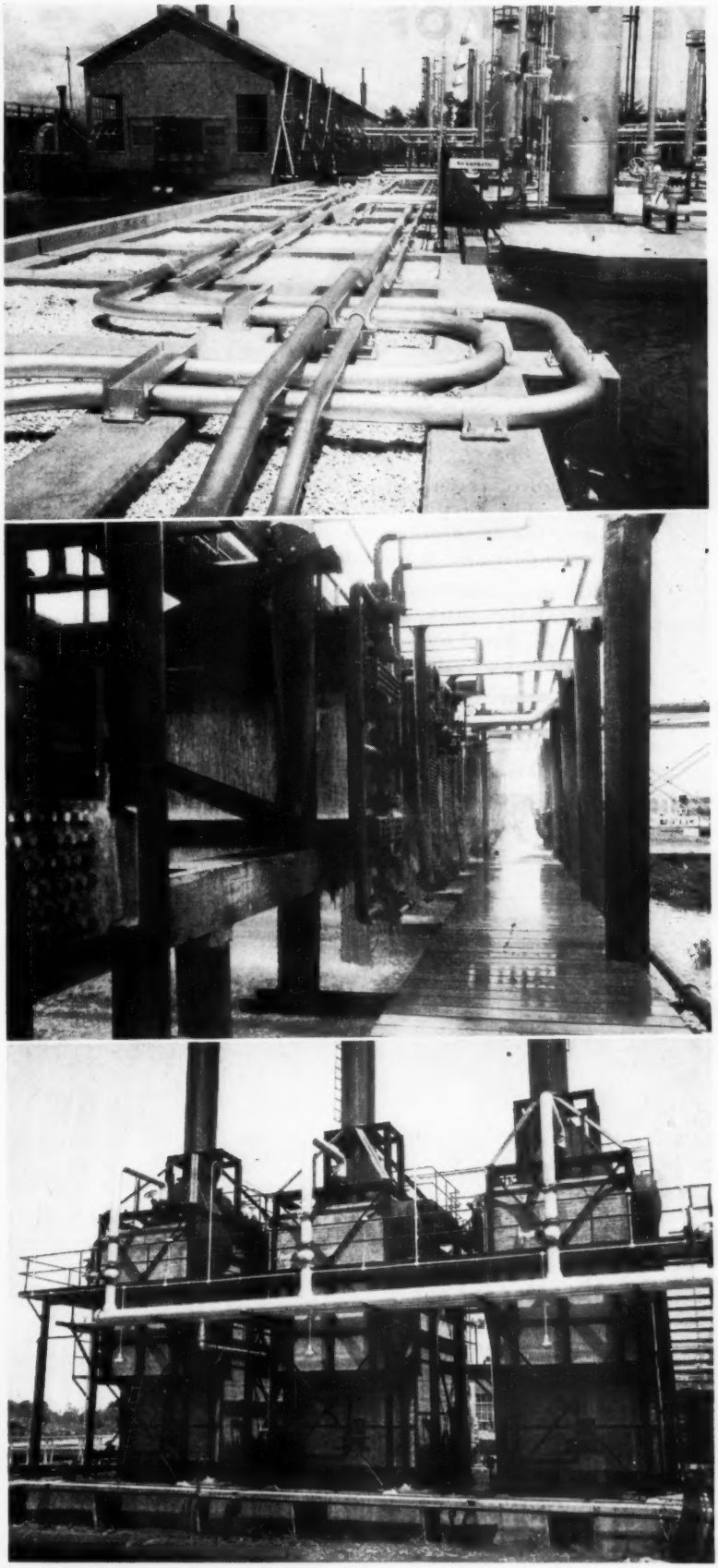


treme west side, was wet to the top at 10,565 ft., placing the water level above that depth. The next lowest well had gas to the bottom of the sand at approximately 10,250 ft. In the east segment, one well had water to the top of the sand at 10,396 ft. Since the next lowest well had gas to the bottom of the sand at 10,164 ft., the water level there is between these two depths.

The discovery well, located on a state-owned water-bed lease, was completed December 22, 1937, in an oil sand at approximately 11,000 ft., after drilling to a total depth of 11,789 ft. Its location is on the south side of the present producing area. Prior to inauguration of cycling operations, seven additional wells were drilled. This development was carried out largely in an attempt to prove up the discovery oil sand and was confined to a relatively small part of the present field limits. Only two of these wells, in addition to the discovery well, found the oil sand productive. The remainder, in turn, were completed in the 10,400-ft. gas sand. Since this development program was not originally planned for cycling, the initial cycling project was one of utilizing the wells already drilled to effect the most efficient recovery from the reservoir involved and to obtain reservoir producing characteristics.

Subsequently, 13 additional wells have been drilled to complete the program. One of these, at a location on the rim of the gas sand area, has been completed in an oil sand. The remainder have been completed in one of the gas sands, most of them in the 10,400-ft. horizon. The practice has been to drill all wells through the depth range of the known sands in the field and set 7-in. casing below the lowest productive sand encountered in the respective wells. This depth varies from 10,000 to 11,000 ft. Wells are completed by perforating casing through the sand to be produced. Three-and-a-half-inch (o.d.) tubing, set on packer to seal off the annulus between tubing and 7-in. casing, is used in all producing wells. Injection wells use 4-in. (o.d.) tubing.

(Continued on page 79)



Top: High-pressure injection gas comes out from the plant through the 6-in. discharge header, passing through the expansion loops shown in foreground. Near the header is a high-pressure piston-type check valve to prevent back flow and also plug valve for shutoff. Center: Centralized banks of open atmospheric cooling and condensing sections. Water, distributed over tops of the sections through individually controlled spray headers, drains back into the canal. Bottom: New steam-generating plant including three drum-type water-tube boilers, each supplying 21,500 lb. per hour of 275 psi., 406° F. steam. Additional steam supplied by four 125-hp. oil-field-type fire-tube boilers (not shown)

VETERAN OF *The Oil Fields*

When severe pressures threaten your strings . . . when extra pullout strength is demanded . . . that's the time you need the time-proved veteran of the oil fields—Republic Electric Weld Casing.

The proved performance of more than 130,000,000 feet of Republic Electric Weld Casing and Tubing covering almost two decades of time indicates that you can rely upon these products for dependable service under all conditions.

High strength and toughness combine with uniform roundness to resist collapse. Accurate threads with plenty of metal under all thread roots—insured by uniform wall thickness —provide high joint strength.

For long service . . . for dependability . . . for fast make-up . . . insist upon Republic Electric Weld Casing.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, New York

INSPECTED INSIDE AND OUT

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, both sides of which can be inspected. Thus, the surface which becomes the inside wall is free from hidden defects.

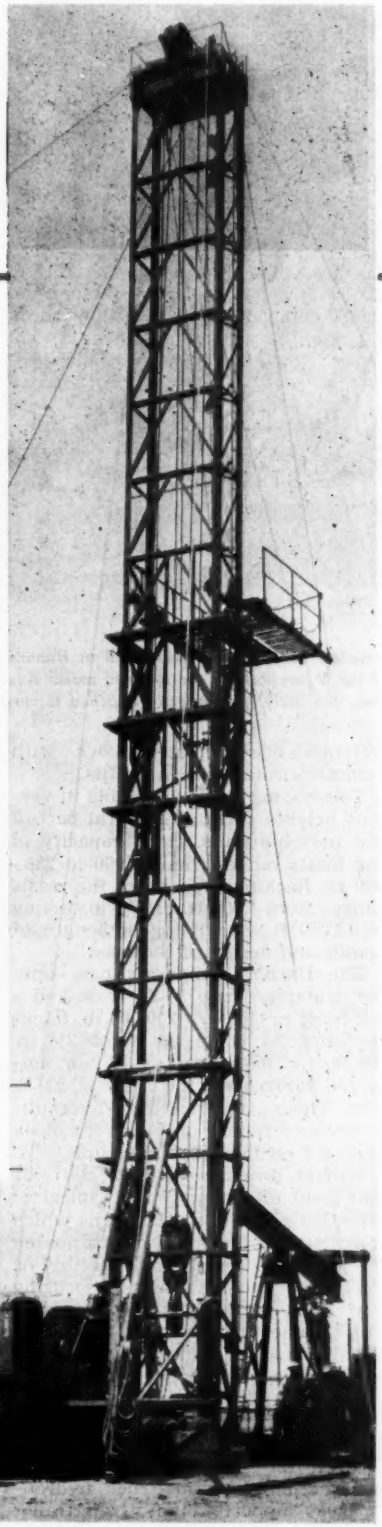
REPUBLIC *Electric Weld*

LINE PIPE

NORMALIZED CASING AND TUBING

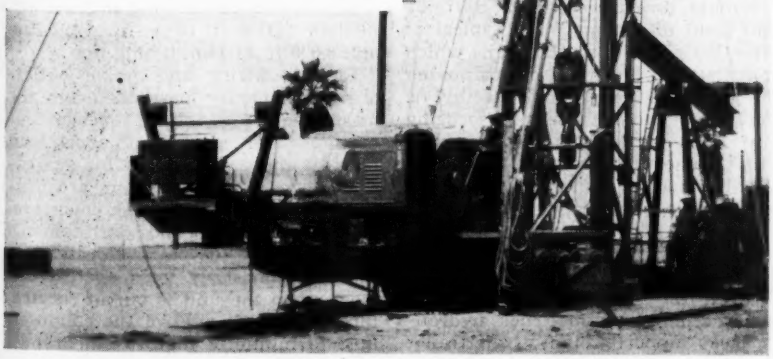
Other Republic Products include Alloy Steels—U[illegible]

Modern Portable Units *in* Drilling And Well Servicing



by H. Stanley Norman

Right: Over-all view of unit with driller at controls. Grillwork platforms on either side of the hoist afford sure footing for crew. Above: Pull hoists of 4½-ton capacity used in securing guy lines permit simple and fast alignment of mast



CONSTANT effort to lower the unproductive service time of drilling equipment, one of the most obviously expensive items apparent in contractors' operating costs, contributed immeasurably to development of modern portable units. Popularity of these units is increasing in California where much of the current development drilling is to pays at medium to shallow depths. Most of the well-service conditions existing in California are well within limitations of the portable units.

The so-called blitzrigs, first introduced a few years ago, actually are the evolutionary fruition of the gin pole and tractor or truck-mounted winches. Modern portable drilling and well-service units consequently are now reaching perfection and represent today the improvements which have been made possible because of field performance. During and since the war these portable rigs have won recognition as one of the most versatile facilities available to the producing and exploration branch of the oil industry.

Speed in moving from one location to another and ability to start actual drilling within a few hours after spotting the equipment at a new location are the most attractive features of the portable units. Contractors, particularly, are enthusiastic about the time-saving features, realizing fully that opportunities for profit in their end of the business exist only if their equipment is engaged in making hole.

These time-saving features with related considerations were the factors chiefly responsible for recent acquisition of a modern portable unit by Harbor Production Co., Los Angeles, a contracting firm. Harbor's new unit, currently equipped exclusively for well-servicing operations, is to be converted soon to a drilling rig. Since delivery was made 2 months ago, the unit has been assigned to well-service duties in the Huntington Beach field.

Customarily, contractors perform

Side view of Harbor Production Co.'s portable rig on its first well-service job at Huntington Beach. The recently added light plant is mounted forward, between the butane tank and the V support for the lowered mast. Auxiliary engine at front supplies power for lifting and lowering mast. Inset: One of two spirit levels (in circle) permanently attached to mast with steel protective flaps welded in position

well-reconditioning services at a fixed fee per hour. For the conventional gin-pole and winch equipment, the hourly rate is currently in the order of $2.50 to $3. The much faster and more costly blitzrigs are offered operators at about $10 to $11 per hour. Experience shows, operators and contractors agree, that the higher hourly fee for the portable units is offset by two advantages: (1) Reconditioning work can be under way in a matter of a few hours from the time equipment is released from its last previous job; (2) the well being reconditioned is off production for a much shorter period, hence the loss of crude and the interruption of production are held to a minimum.

Preference for the more expensive but much faster blitzrigs has reached proportions of a demand on contractors when operators are forced to correct difficulties with a well of high daily production. Scarcity of crude and the loss of production incurred by idle wells have become the primary considerations. Consequently, the equipment which may permit resumption of production several days earlier than possible with conventional service units is favored by the operating companies. Furthermore, time saved on drilling and servicing jobs permits contractors to increase volumes of completed work with commensurate gains in profits.

Telescoping masts, available in various heights, form an integral part of the portable units. Hook capacity of the masts ranges from 70,000 to 250,000 lb. Racking capacity of the masts ranges from 4,600 ft. of 2½-in. tubing to 13,000 ft., depending on length of stands and design of the mast.

The Harbor company's new unit, for example, has a 90-ft. mast and a net hook capacity of 200,000 lb. Racking capacity is 12,000 ft. of 2½-in. tubing in 60-ft. stands. When collapsed for moves, the mast is 52 ft. long. The mast is raised by hydraulic jacks or rams and travel block mounted on the semitrailer unit.

Bubble levels secured to the side and front of the mast are typical of attention given to small details which contribute to the speed of positioning the unit. Another similar facility is the use of pull-lift hoists in securing guy lines to the deadmen anchors. This ratchet arrangement for securing the mast in plumb position permits speedy first installation and affords a simple means of correcting for stress conditions which may arise during drilling or servicing operations.

When the semitrailer unit is detached from its towing truck, hydraulic jacks support weight of the trailer frame, the engine, and hoist. When ready to move, jacks raise the trailer unit, permitting the towing truck to back under the front extension. Jacks are then lowered and folded into position on the trailer where they are secured by chains until the next location is reached.

Since the unit was first placed in operation, Harbor has added an electric-light plant just ahead of the butane tank and a pneumatic tubing tong assembly which is mounted on a separate trailer. The air compressor, tank, and tongs constitute a separate trailer unit but this arrangement is compact, small, and light and can be towed simultaneously with the servicing unit.

The double-drum hoist will accommodate 11,000 ft. of ½-in. sand line and 8,000 ft. of 1-in. tubing line.

Electric wiring and socket outlets are permanently positioned on the mast, requiring only disengagement of plugs and spooling of short lead lines at the ground level for successive moves. Light reflectors are protected by heavy gage mesh coverings.

The pipe rack and derrickman's platform is at the 55-ft. elevation on the 90-ft. mast. It folds against the mast when the unit is out of service, thus reducing height of the collapsed unit to minimize highway clearance.

Bateman Field Cycling Operations Doubled

(Continued from page 75)

Cycling operations were started January 19, 1942, following the completion of the original plant having a capacity of 30,000,000 cu. ft. of gas daily. Since then, through April 30, 1946, a total of 44,358,604,000 cu. ft. of gas has been produced with volumes calculated at pressure base of 10 oz. above 14.4 psia. From this, 1,157,845 bbl. of liquid have been recovered, and a residue of 40,901,266,000 cu. ft. of gas has been injected into the producing sand.

The original cycling project with the small plant embraced only the graben segment of the field. Since completion of the enlarged plant, increasing gas handling capacity to 70,000,000 cu. ft. daily, the project has been extended to include that segment of the field west of the graben area. Within these two segments there are eight gas wells, exclusive of three being used for injection wells. These include seven wells completed in the 10,400-ft. sand, two of which are shut in, and one in the 9,900-ft. sand which is being produced for makeup gas. Six additional gas wells, shut in since completion, are located in that segment east of the graben.

In the present program, the 10,400-ft. sand is being produced in the graben from three wells. These are located in a row across the width of the sector in the north and widest part. The cycle pattern is from two injection wells located from 1 to 1½ miles to the south in the narrow part of the graben, the cycle gas fanning out to the northwest, north, and northeast. Dry input gas already has advanced to one of the original producing wells (School Board Well No. 1) which has been shut in and production shifted to another well. The makeup gas well (School Board Well No. 2), located about 1,800 ft. north of the shut in dry gas well, originally was completed to be produced from this sand, but because of mechanical difficulties arising from corrosion, it was worked over and recompleted in the 9,900-ft. sand.

Production of the west sector is being taken from two wells located about 4,200 ft. apart with cycled gas being injected through a single well about 2,200 ft. north of the mid-point between them. The cycle pattern in this case, being from the north to the southwest and to the southeast, is the reverse of that in the graben area. One additional gas well has been completed in the 10,400-ft. sand in this segment. This is located about 1½ miles farther south of the present producing wells and has been shut in since completion.

Field production is delivered to the plant through a central metering and choke control station located at the plant inlet with individual 2½-in. flow lines direct from the respective wells. Since the field is located in a marsh, the lines are supported above the surface level along the tops of piles.

Metering is through typical orifice metering settings. Meter runs are installed horizontally with the orifice taps pointed up and are housed to assist in retaining heat in the lines during the cold weather. Field lines lead to the paralleling meter runs through steam jackets which raise the temperature of the incoming gas to prevent hydrate formation in expansion of the gas through the chokes. Well temperatures range from 90° to 160° F.

Adjustable chokes for control of individual well production are installed in the outlet ends of the meter runs. With working pressures of approximately 4,000 psi. at the wells, pressure of the gas behind the chokes is from 3,300 to 3,500 psi. In present operation, the chokes are set to reduce the pressure to 2,600 psi. The 4-in. meter runs are manifolded downstream from the chokes to an 8-in. header to the plant inlet.

All flow lines ahead of the meter runs have connections to a bypass header to a high-pressure separator and metering installations for separate testing of production of individual wells. Flow through the testing separators after metering is returned to the plant inlet system.

Field gas delivered at the plant is composed of the following components:

Components	Mol. %
C_1	93.20
C_2	3.19
C_3	1.20
i-C_4	.28
n-C_4	.37
i-C_5	.17
n-C_5	.14
C_6	.30
C_{7+}	1.15

From 60 to 65 per cent of the plant's total liquid recovery is obtained in a single inlet separator. This is a 54-in. (i.d.) by 18-ft. vertical column operated at a pressure of 2,000 psi.

Pressure to the separator is maintained by two reducing regulators on the 8-in. inlet gas header. The 2,600-psi. gas from the chokes on the meter runs to the reducing regulator first is passed through two jacket-type steam heaters in series in which temperature of the gas is raised, if necessary in cold-weather operations, to prevent hydrate formation in the ensuing pressure drop. The expansion from 2,600 to 2,000 psi. through the regulators cools the gas to approximately 100° F. Temperature is further reduced to from 80° to 85° F. in passage of the gas through six atmospheric cooling sections.

Overhead gas from the inlet separator contains the following components:

Components	Mol. %
C_1	94.34
C_2	3.16
C_3	1.17
i-C_4	.27
n-C_4	.34
i-C_5	.15
n-C_5	.12
C_6	.23
C_{7+}	.22

Flow of the above gas is split to the two high-pressure absorbers, one at the original plant handling approximately 30,000,000 cu. ft. daily and the other at the new plant handling approximately 40,000,000 cu. ft. daily. Each is 54 in. in diameter, the original being 43 ft. high and the new one 50 ft. high, and operates at 2,000 psi. pressure. Residue gas goes to the compressor suction header. A scrubber on the residue gas line removes any absorption-oil carryover from the gas before it reaches the compressor cylinders. The scrubber is equipped with a high-level alarm connected to a horn and light system which gives immediate warning of dangerous rise of liquid level in the vessel.

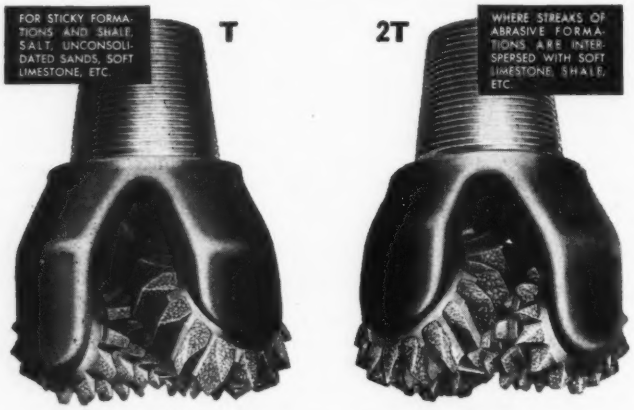
Five 600-hp., 2-cycle, 3-cylinder compressors are provided. Two were installed with the original plant. Three have been added in the plant enlargement program.

Two cylinders, one on each of two compressors, are utilized for recompressor duty. All others take suction in parallel and boost the 2,000-psi. residue gas in one stage to 4,800 psi. for discharge to the field input gas line. The discharge header, fabricated from 6-in. Schedule 160 pipe, is designed for 5,000-psi. working pressure. A piston-type check valve in the discharge header prevents any backflow of gas from the field injection line in case of a plant line break.

All three injection wells are on the same gas-return line, which continues 6 in. to the first well (5 Wax Bayou), reducing to 4 in. from there to the other two wells (4 Wax Bayou and 2 State-Bateman Lake). Like the field gathering lines, the return line is supported above the surface level along the tops of piles. Metal straps hold the line in place with an expansion loop every 1,000 ft. A 4-in. line leads from the main line to each of the wells, and on this at each well installation there are, in order from the down side, a plug valve for positive gas shutoff, a mist extractor for removal of any lubricating oil, a globe valve for volume regulation, an orifice-meter setting, a piston-type check valve to prevent backflow in the event of a line break, and a 4-in. wing valve to the well.

Jacket water of the five engines is circulated in a closed system through atmospheric cooling sections. Two 8-in., 2,230-g.p.m. centrifugal pumps, driven by steam turbines, are provided for this purpose. Temperature

There is a REED ROCK BIT.....


FOR STICKY FORMATIONS AND SHALE, SALT, UNCONSOLIDATED SANDS, SOFT LIMESTONE, ETC.
T
2T
WHERE STREAKS OF ABRASIVE FORMATIONS ARE INTERSPERSED WITH SOFT LIMESTONE, SHALE, ETC.

For the SOFT FORMATIONS

FOR SALT, GYPSUM, ANHYDRITE, MEDIUM HARD SHALE, LIME ROCKS, ETC., INCLUDING UNCONSOLIDATED SANDS.
M
"HM" TYPE FOR MEDIUM HARD, NON-ABRASIVE LIME-ROCKS AND BROKEN FORMATIONS.
HM
FOR THE MEDIUM HARD ABRASIVE LIMESTONES AND BROKEN FORMATIONS
2HM

For the MEDIUM HARD FORMATIONS

MEDIUM HARD FORMATIONS WHICH CHIP EASILY, SUCH AS: ANHYDRITE, HARD LIME ROCK, HARD SHALE, ETC.
2
2H
FOR THE HARD DENSE LIMESTONES AND ABRASIVE OR NON-ABRASIVE LIMESTONES AND SANDS
FOR HARD, ABRASIVE FORMATIONS AND THE HARD, DENSE LIME ROCKS, ABRASIVE SANDS, CHERT, ETC.
2C

For the HARD FORMATIONS and EXTRA HARD FORMATIONS

.....available to efficiently drill specific formations

Reed Rock Bits are designed and constructed for maximum safety under the toughest drilling conditions.

The roller bearing mounted cutters are independently supported on drop-forged bit quadrants that are cross tied with the bridge. This construction provides maximum strength and safety for the drilling of any formation, especially the hard formations with heavy drilling weights on the bit.

The inherent characteristics of the Reed Cross Roller Cutter principle of design make for high drilling efficiency when only light drilling weights can be used.

REED ROCK BITS

Safe, Durable, Efficient

REED ROCK BITS

✓ *Check these points for*

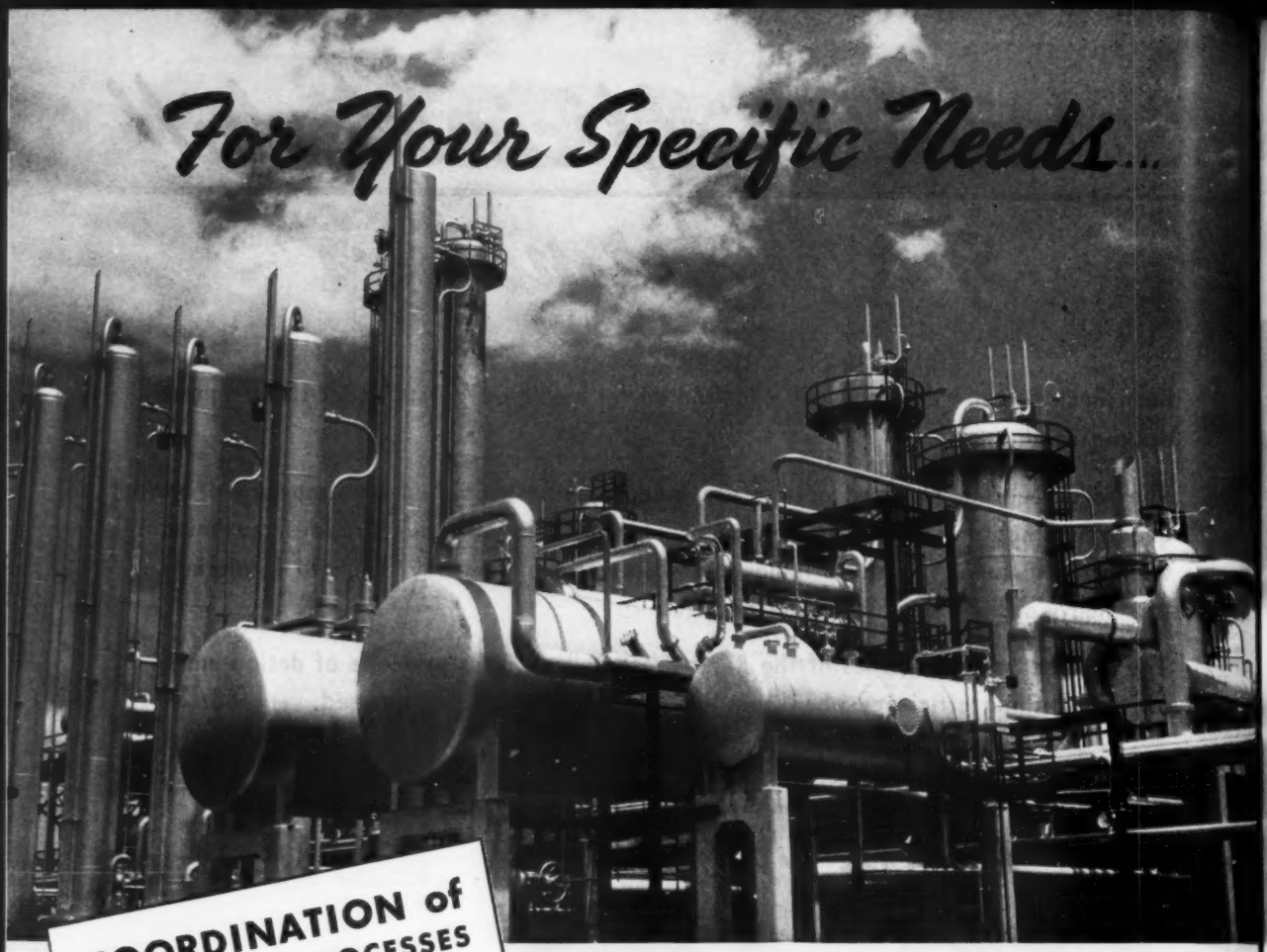
FASTER—STRAIGHTER—FULL GAUGE HOLE

- REPLACEABLE SLUSH NOZZLES FOR CORRECT CLEANING ACTION
- CUTTER TEETH AND GAUGE BEVELS FULLY PROTECTED
- UNUSUALLY STRONG BEARING ASSEMBLIES
- DROP FORGED BIT QUADRANTS UNIFIED FOR GREATER STRENGTH AND SAFETY

Reed ROLLER BIT COMPANY

HOUSTON 1, TEXAS, U. S. A.

EXPORT OFFICE • 1836 R. C. A. BUILDING • NEW YORK 20, NEW YORK, U. S. A.



COORDINATION of OIL FIELD PROCESSES

Cycling, Pressure Maintenance, Repressuring
High and Low Pressure Recovery
Crude Stabilization

with REFINERY PROCESSES

Distillation and Recovery Systems
Thermal Reforming, Cracking, and Viscosity Breaking
Catalytic Reforming, Cracking, Alkylation, Polymerization and Isomerization

The only organization actively and simultaneously engaged in both these fields, Pritchard's Petroleum Division is uniquely qualified to coordinate effectively all elements of your project.

Pritchard builds what you want...

from your specifications . . . from plans developed in collaboration with your engineers . . . or will design "from scratch" and carry to completion.

Abreast of processing trends and new techniques, Pritchard engineers know how to produce desired qualities and yields most economically. Thorough and practical familiarity with the *whole* scope of petroleum engineering offers an unusual advantage in meeting all problems effectively. Completions on minimum schedules and budgets are assured by the proven competence and skill of an adequate and experienced staff. Any part of the comprehensive Pritchard service is available separately.

PETROLEUM DIVISION
2200 Fidelity Building
Kansas City 6, Missouri

J.F. Pritchard & Co.
ENGINEERS • CONSTRUCTORS • MANUFACTURERS
FIDELITY BUILDING, KANSAS CITY 6, MISSOURI

New York • Chicago • Los Angeles • Detroit • Pittsburgh • St. Louis • Houston • Tulsa
St. Paul • Omaha • Denver • Dallas • Atlanta • Salt Lake City • El Paso • Mexico City

of the jacket water through the cooling sections is reduced from about 128° to 115° F. Compressed air at 250-psig. pressure is provided for starting engines.

Distillate separated in the 2,000-psi. pressure-inlet separator is a product having a specific gravity of approximately 0.67 and amounts to about 35 g.p.m. It is flashed down in two stages, first to 725 psi. and then to 260 psi. A parallel flash-down system is provided for the rich oil from high-pressure absorber. The 725-psi. flash gas from both systems is passed through a scrubber for removal of any liquid carryover, and thence to the two recompressor cylinders. Recompressed to 2,000 psi. and then cooled from about 240° to 90° F. in an after-cooler section, this gas joins the high-pressure absorber residue gas.

The 260-psi. flash gas from both systems, amounting to approximately 1,460,000 cu. ft. per day, goes to the fuel and instrument-gas systems. Of this use, compressor engines require about 432,000 cu. ft. daily; oil heaters, 300,000 cu. ft.; and boilers, 698,000 cu. ft. The fuel supply is augmented by vent gas from the reabsorber residue scrubber and the depropanizer reflux accumulator.

Liquid from the 260-psi. distillate flash drum flows by way of a liquid-level control valve to two filters, and thence, successively, through two banks of heat exchangers and a steam heater to the final stripping tower. The filters, each 2 ft. in diameter and 8 ft. high, operate in parallel and eliminate any water condensation carried over from the flash drum. The exchangers and heater raise the temperature of the stream from about 75° to 325° F. at the stripper inlet. The stripper is a 3 by 30-ft. column with 10 bubble trays and operates at 90-psi. pressure. No additional heat is applied other than stripping steam. Vapors vented at 325° F. top temperature are partially condensed and cooled to 85° F. in atmospheric cooling sections and run to a 85-psi. working-pressure accumulator and then to the reabsorber.

The stripped distillate leaves the bottom of the stripper through a liquid-level control valve at a temperature of 320° F. After initial cooling to 122° F. in exchange of heat with the incoming cold distillate, the stream is combined with the stabilized stream from the depropanizer column. The joint streams are cooled to 85° F. in the atmospheric cooling sections and run to storage. The combined product consists of the following components:

Components	Mol. %
C_3	.17
i-C_4	8.65
n-C_4	13.24
i-C_5	7.20
n-C_5	6.04
C_6	13.31
C_7	51.41

Rich oil from the 260-psi. flash tank of the absorption system flows through two banks of exchangers to the 90-psi., 370° F. flash drum. The flashed vapors are partially condensed and cooled with the hot vapors from the distillate stripper, previously mentioned, for additional charge to the reabsorber. The reabsorber is a 3 by 58-ft. column having 24 bubble trays and operates at 80 psi. Residue gas goes through a scrubber for removal of any oil carryover and thence to the fuel system. Rich-oil reabsorber bottoms and those from the 90-psi. flash tank are pumped in a joint stream to two direct-fired furnaces.

Temperature of the combined rich-oil stream to the furnaces is approximately 350° F. These furnaces, operating in parallel, were designed for a heavy duty of 11,239,000 B.t.u. per hour each at a flow rate of 322 g.p.m., and deliver the rich oil to the still at a temperature of 480° F. The still is 66 in. in diameter by 54 ft. high and contains 20 bubble trays. Top temperature is held at 220° F. by a temperature controller operating on the reflux. Stripping steam is added to the still, and the resulting overhead product, separated from the absorption oil and having an end point of approximately 400° F., passes through atmospheric condensing coils to the reflux accumulator and depropanizer charge tank operating at 85 psi. and 85° F.

The stripped hot oil from the bottom of the still is returned to a 10 by 30-ft. lean-oil surge tank after passing through the lean oil-rich oil exchangers for initial cooling at 178° F. and atmospheric cooling sections for final cooling to 85° F. Lean oil circulated to the absorbers has an initial boiling point of 460°-F. and a specific gravity of 0.832 (A.P.I. gravity 38.6°). The desired specifications are maintained by cycling a small shunt stream from the bottom of the still through a steam-heated purifying still.

Lean oil is circulated to the tops of the two high-pressure absorbers by a single 13-stage centrifugal pump driven by steam turbine rated at 1,250 hp. at 3,500 r.p.m. This pump, located at the new plant, has a 6-in. discharge with capacity of 800 g.p.m. at 3,000-psi. discharge and 250-psi. suction pressure. Circulation rate normally is approximately 427 g.p.m. at 2,400-psi. discharge and 125-psi. suction pressure, 300 g.p.m. going to the high-pressure absorber at the new plant and 127 g.p.m. to the absorber at the original plant. Volume to the respective absorbers is controlled by high-pressure regulators operated by rate of flow controllers on the lean-oil lines. A high-pressure reciprocating pump which formerly was used for lean-oil circulation at the original plant, is tied into the system and maintained for standby service.

Suction for the high-pressure pump is taken from the discharge of a single-stage centrifugal booster pump driven by a 90-hp. steam turbine. Present circulation rate, with suction direct from the lean-oil surge tank, is 493 g.p.m. at 125-psi. discharge pressure with 427 g.p.m. going to the suction of the high-pressure pump and 66 g.p.m. to the top of the low-pressure reabsorber. A duplicate pump is provided for standby duty.

The raw unstabilized production from both the original and the new plant is depropanized at the latter plant. The two streams are combined in the 85-psi., 85° F. operated depropanizer charge accumulator tank previously mentioned. Vapors flashed from this tank are recycled to the low-pressure absorber for additional recovery. Liquid charge is pumped by a duplex-steam pump in a single stream through exchangers direct to the depropanizer column. This is a 42-in. by 68-ft. vessel containing 30 trays and operates at 220 psi. The stream is preheated to 220° F. in exchange of heat with the hot bottoms. Top temperature of 105° F. is maintained by a temperature-control valve on the reflux. Bottom temperature of 245° F. is maintained by a steam reboiler. Overhead vapors are condensed through an atmospheric cooling section and accumulate in a 4 by 8-ft. vessel operating at 215 psi. and 90° F. for reflux stock. The flash vapors, consisting only of the most volatile uncondensable ends (propane and lighter), go to the fuel system. The depropanized hot bottoms after initial cooling to 122° F. in exchange of heat with the cold charge is combined with initially cooled distillate stream and run through final coolers to storage.

Additional new plant facilities include three drum-type, water-tube boilers, each capable of supplying 21,500 lb. per hour of 275-psi., 406° F. steam. Steam supply is augmented by four 125-hp. oil-field-type, fire-tube boilers at the original plant. All have induced draft provided by turbine-driven blowers.

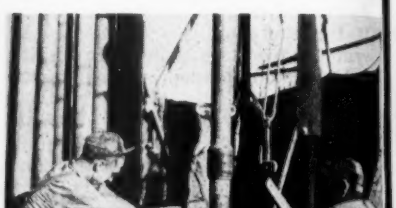
All pumps are steam powered, and except for the depropanizer charge, depropanizer reflux, and the raw gasoline stream from the original plant, which employ reciprocating pumps, they are turbine-driven centrifugals. All exhaust steam goes to the atmospheric-type exhaust-steam condensers. The water drained from still accumulation and reboilers is returned first to a skimmer tank for removal of any oil content. The water then flows into the hot well where it joins the condensed exhaust steam, and the combined stream is then pumped to a deaerating stripper, heated with exhaust steam, stripped of dissolved air and pumped to boiler feed water.

Raw makeup water is processed through a sand filter and a softener

WHY DRILLERS LIKE TO WORK WITH

NATIONAL SEAMLESS

STRENGTH AND SAFETY of National Seamless are the direct result of quality steel and the seamless process of piercing a solid billet of metal. There are no welds—therefore, no possibility of a weak spot.



TIGHT JOINTS IN FAST TIME are a result of the precision thread cutting equipment used in making National Seamless Pipe.

When you really want the inside story on drill pipe, casing, and tubing, talk to the drillers in the field. These are the men who live with pipe day after day. They see it in action from the time it is delivered to the field until completion of the well. They know just where to look for real time saving and smooth running features. They know each and every time it is under some stress or strain—when an extra margin of security helps speed the job and keeps down the worry.

They'll give you a straight answer, because they know. They'll tell you for easy, quick stabbing, for smooth running and tight joints, for less trouble and greatest reliability, no other tubular goods can come up to seamless—that no other method of making pipe can equal that of piercing a solid billet of steel, for uniform wall strength—and nothing surpasses seamless, for strong threads, smooth make-up, and tight joints.

With those who know pipe and who work with pipe, U·S·S National Seamless is America's preferred drill pipe, casing, and tubing.

U·S·S NATIONAL SEAMLESS

drill pipe... casing... tubing

WALLS WITHOUT WELDS

NATIONAL TUBE COMPANY · USS · STEEL · UNITED STATES STEEL

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

United States Steel Export Company, New York

UNITED STATES STEEL

unit to a 1,000-bbl. supply tank, from which the treated water is pumped to the deaerating stripper by a single-stage centrifugal pump having a 1½-in. suction and 1-in. discharge. The stripper is provided with a liquid-level control to a valve in the feed line from the pump discharge which regulates automatically the volume of makeup water to the stripper.

The hot boiler-feed water from the bottom of the stripper is pumped to the boilers by a single-stage centrifugal pump having a 3-in. suction and 2-in. discharge. Both pumps are mounted on the same base and driven by the same 45-hp. steam turbine. Two identical units are provided, one for standby service. The makeup water pump, in addition to supplying makeup for boiler-feed water, also discharges to a 1-in. line circulating cooling water over the bearings of the high-pressure centrifugal pumps.

Water for all plant operational needs is pumped directly from a canal adjacent the plant site. Three turbine-driven well pumps, set on a dock over the canal, are provided for normal requirements. Each has an 18-in. discharge with a capacity of from 3,500 to 5,750 g.p.m. with a discharge head of 35 to 50 ft. An additional high-pressure turbine pump is installed to supply water for the fire-control system and other emergency needs. This pump has a 190 to 224-ft. head pressure at pump discharge.

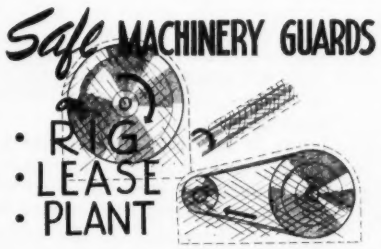
Two Central Locations

All atmospheric cooling and condensing sections are placed at two central locations, one for the engine jacket water coolers and exhaust steam condensation adjacent the compressor buildings, and the other for the remaining sections on another side of the plant. The jacket water coolers are enclosed on the sides with louvers to prevent spray from blowing over adjacent plant installations. Sections at the other location are entirely open. Cooling water is pumped to the tops of the sections through an 18-in. header system and distributed over the sections through spray headers, individually controlled. The hot spray water collects in open sumps below the sections and drains back into the canal. The point at which the water returns to the canal normally is on the opposite side of the plant from the pump station to keep the hot water away from the pump suction. However, the sump below the jacket water cooling sections has a 22-in. bypass drain line which empties into the canal at a point just above the pump station so that in event of abnormally cold weather the hot drain water can be diverted to help maintain the cooling temperature in order to prevent undue operating difficulties caused by the low temperatures.

Electric power is used mainly for plant lighting and is supplied by a single 120 to 208-volt, 4-wire, 3-phase, 60-cycle, 75-kw. generator driven by a steam turbine. Another small generator, formerly used at the original plant, is available for standby service, although it would be possible, if necessary, to operate without electric power. A camp is not maintained in the field nor at the plant.

The plant has a high-pressure water system, served by the high-pressure fire pump at the water station, for fire fighting. In addition, fire extinguisher carts are placed at various places around the plant site. An emergency shutdown system also is provided with switches at convenient points. Any one of the switches operates to kill fires under the boilers and heaters, cut the fuel to the engines, shut down the lean-oil pumps, shut off the inlet gas, and bleed the pressure off the absorber and related equipment.

Storage for plant production consists of five 1,000-bbl. tanks located at the central tank battery. A 10-in. outlet header leads to the suction of a turbine-driven centrifugal pump which boosts the production direct to the crude line through a 3-in. discharge. Two pumps are provided for alternate or parallel operations.



Safe Machinery Guards

by Henry W. Boggess*

JOB safety depends upon three controlling factors: (1) Safe environment, (2) operating policy, and (3) safety consciousness and cooperation of management and men.

Under the first, safe environment, the matter of proper safeguards ranks high. By safeguards in this instance is meant hand rails, railings, machine enclosures, etc.

The American Standards Association has published standards for such guards and in many states there are laws specifying minimum requirements. It is true that any guard built and installed in accordance with A.S.A. standards will pass the requirements of any state. It therefore seems desirable that A.S.A. standards should be adopted by any employer engaged in a guarding program.

While there are numerous kinds of guards, the outstanding ones of which will be later discussed, the most commonly used of all is the standard "railing guard." There are limitations governing the use of railing guards but, where permissible for use, the construction and installation of railing guards should be rightly understood. Railing guards are not intended as adequate protection for open gears, revolving shafts, sprockets, governors, etc. They should never be used where the guard must be installed 15 in. or closer to the nearest moving part. Generally, railings are used on elevated places of work, around open pits, and often around fly wheels where the rail can be conveniently placed 18 in. from nearest moving part.

Railing guards may be constructed of:

1. Wood† (not less than 2 by 4 in.)
2. Pipe (minimum size 1¼ in. o.d.).
3. Angle iron (minimum 1¼ by 1¼ by ⅛ in.).

Railings should be 42 in. above floor level with a center rail halfway between floor and top rail (21 in.). Uprights to have maximum spacing of 8 ft. Such a guard should be securely anchored by having uprights bolted to the floor or, where mobility of guard is desirable, they should be snugly fitted into floor sockets at least 6 in. deep. Any such guard should be capable of standing a 200-lb. horizontal thrust.

Where used on elevated platforms or around open pits, railing guards should be equipped with toe boards at least 6 in. high.

*Superintendent of Employment Insurance, Safety Department, Sinclair Prairie Oil Co.

†Wood railings should be installed only for temporary protection such as in construction work.

Morris Brewster Carlson, subsurface geologist at Lake Charles, La., for Shell, has been released from the Army after serving 3 years as a first lieutenant. Other personnel of the Texas-Gulf area recently returned from service include: **William Basset Hunkapiller,** seismologist at Lake Charles; **William Lee Jugers,** assistant seismograph operator; and **M. H. Guess,** production foreman at Hobbs, N. M.

Geological Survey Completes New Structure Map for Rangely Field

by N. W. Bass

The Rangely oil field, in Rio Blanco County near the northwest corner of Colorado, has been mapped by the U. S. Geological Survey to supply data to aid in the search for new oil reserves and to facilitate the administration of federal oil and gas leasing laws on public lands in the field. The author is geologist with the U. S. G. S. at Denver, and this article is taken from the Survey's Oil and Gas Investigations Preliminary Map 67.

As of November 1, the field had 147 wells, with 27 scheduled for November completion dates.

THE Rangely oil field includes a small oil pool in fracture zones in the Mancos shale at depths ranging from about 500 to 1,700 ft. and a very large oil pool in the Weber sandstone at depths ranging from about 5,500 to greater than 6,500 ft. The Continental Oil Co. 2 Rooth, in SW SW 15-2n-103w (completed in 1946), is the only well yielding oil from the Shinarump conglomerate, and the size of the oil pool in this formation is unknown as yet.

The oil pool in the Weber sandstone was discovered in 1933 by The California Co. 1 Raven in NW SE 30-2n-102w. After yielding a total of about 8,000 bbl. of oil in 1933, this well was shut in until September 1943 when it was again placed on production. During the early part of 1944 it yielded about 225 bbl. a day.

Active development drilling has been under way since 1944, and on September 13, 1946, the field had 120 oil producers in the Weber sand and 46 wells drilling. Except the Algord Oil Co. 2 Guiberson in NE NE 18-2n-102w, which is being pumped, all wells flow. The wells are prorated at 200 bbl. a day each.

The initial daily yield of the wells varies between less than 100 to greater than 1,000 bbl.; the yield for most wells is between 250 and 500 bbl. The 1-D Cobb-Stringer Government, in SE SE 4-1n-102w, is the only dry hole that has been drilled to the Weber sandstone. Though a pipe-line outlet for the field was not available until September 19, 1945, total production in 1945 was 1,540,475 bbl. and for the first 7 months in 1946 was 4,067,566 bbl.[1]

Structure

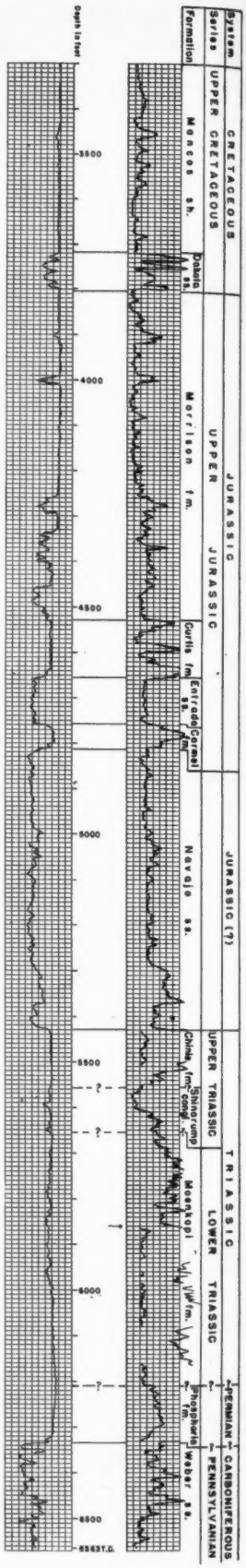
The structure contour map on the top of the Weber sandstone shows a large asymmetrical anticline. In general, the fold on the Weber sandstone is similar to that on the exposed rocks,[2] except that the crest of the fold on top of the Weber sandstone in the northwestern part of the field lies a short distance south of the crest on the exposed rocks. According to the few data available, the rate of dip of the surface beds and the Weber sandstone differ in parts of the south flank of the fold. A structural relief on the top of the Weber sandstone of about 950 ft. above the oil-water contact is indicated by the water level in the Continental Oil Co. 1 Rooth, in NW SW 15-2n-103w, on the northwest nose; and in the Algord Oil Co. 1 Guiberson in SE NE 18-2n-102w, on the northeastern flank of the anticline.

The positions of the three normal faults shown on the subsurface structure contour map on the southeastern part of the anticline are tentative because only a few data bearing on the faults are now available. The faults have been drawn with a northeast trend because many faults and joints in the exposed rocks have this trend.[2]

The Weber sandstone, which is the main oil-bearing formation in the field, lies at depths ranging from about 5,500 ft. on the crest of the anticline to 6,576 ft. in Continental Oil Co. 1 Rooth. Its total thickness is about 1,200 ft., according to an interpretation[3] of the 1 Raven in NW SE 30-2n-102w, that penetrated the formation. It consists of very fine-grained, gray to light buff sandstone, interbedded with thin beds of red shale and thin beds of very light gray dense sandstone. In parts of the field thin beds of coarse, very micaceous sand are present. The red shale units increase in number downward through the formation.

The known oil-bearing beds in the Weber sandstone occur in the top 700 ft. of the formation, and in much of the field in the top 500 ft. A core of the uppermost 200 ft. of the sand in the Continental Oil Co. 1 Rooth, at the northwest end of the present producing area, shows mostly oil-saturated, very fine sand, and only a few thin beds of red shale and barren, very tight sand, and shaly, micaceous, slightly arkosic coarse sand. Some beds of the oil-saturated sand are cross bedded at low angles. The sand is more uniform in character, however, in this well than in many wells in the mid-

(Continued on page 93)



Electric log of a well in the north part of the Rangely field. (After log by Schlumberger Well Surveying Corp.)

| System | Series | | |

PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Physical Properties of Aluminum Alloys

THE chemical composition and some of the applications of aluminum alloys were indicated on the Progress in Metals page of August 10, 1946.

The conditions in which aluminum alloys are employed or the main treatments that they may undergo are:

1. Wrought—(S alloys):

(H) Hardened by the working or fabrication at room temperature. Degree of hardness is indicated as quarter, half, etc., as 1/4H, 1/2H, 3/4H and H.

(O) Softened by annealing at 800° F. for 2 hours and cooled slowly (50° F. per hour) to 450° F.

(W) Solution heat treatment by heating at 910°-980° F. until the material is thoroughly heated (2 hours for ½-in. thickness) and quenched in cold water. The symbol (W) is used for such a condition unless the alloy spontaneously undergoes aging (17S and 24S) at room temperature.

TABLE 1—PHYSICAL PROPERTIES OF CAST-ALUMINUM ALLOYS

Alloy—	Ultimate T.S. (psi.)	Elongation (per cent)	Brinell hardness	Density (lb./cu. in.)
Die castings:				
13	33,000	1.8	80	.095
85	35,000	3.0	70	.100
Sand castings:				
43	19,000	4.0	40	.096
195-T4*	31,000	8.0	65	.100
195-T6	36,000	4.0	80	.100
214	25,000	9.0	50	.095
220-T4*	45,000	14.0	75	.092
355-T6	35,000	3.5	80	.097
356-T4*	28,000	6.0	55	.095
Permanent mold castings:				
43	21,000	2.5	45-55	.097
122-T65	40,000		125-150	.104
A132-T4	34,000	1.0	90-120	.097
142-T61	40,000		100-130	.100
B195-T4	33,000	4.5	70-90	.101
A214	21,000	2.5	50-65	.096
355-T6	37,000	1.5	90	.097
356-T4	28,000	5.0	60	.095

*Alloys with T4 treatment will during 6 months' storage attain nearly the tensile strength of T6 treated alloys.

TABLE 2—PHYSICAL PROPERTIES OF WROUGHT-ALUMINUM ALLOYS

Alloy or temper—	Ultimate T.S. (psi.)	Yield strength (psi.)	Elongation % in. 2 in.	Brinell hardness 500 kg.-10 mm.	Shearing strength (psi.)	Fatigue strength (psi.)
Strain hardened:						
2SO	13,000	5,000	*35	23	9,500	5,000
2S1/4H	15,000	13,000	*12	28	10,000	6,000
2S1/2H	17,000	14,000	*9	32	11,000	7,000
2S3/4H	20,000	17,000	*6	38	12,000	8,000
2SH	24,000	21,000	*5	44	13,000	8,500
3SO	16,000	6,000	*30	28	11,000	7,000
3S1/4H	18,000	15,000	*10	35	12,000	8,000
3S1/2H	21,000	18,000	*8	40	14,000	9,000
3S3/4H	25,000	21,000	*5	47	15,000	9,500
3SH	29,000	25,000	*4	55	16,000	10,000
52SO	29,000	14,000	*25	45	18,000	17,000
52S1/4H	34,000	26,000	*12	62	20,000	18,000
52S1/2H	37,000	29,000	*10	67	21,000	19,000
52S3/4H	39,000	34,000	*8	74	23,000	20,000
52SH	41,000	36,000	*7	85	24,000	20,500
Heat treated:						
14ST	65,000	50,000	10	130	45,000	16,000
17SO	26,000	10,000	20	45	18,000	11,000
17ST	62,000	40,000	20	100	36,000	15,000
17SRT	62,000	46,000	13	110	36,000	.....
Alclad 17ST	56,000	33,000	18	...	32,000	.....
Alclad 17SRT	57,000	40,000	11	...	32,000	.....
24SO	*26,000	10,000	20	42	18,000	12,000
24ST	68,000	45,000	20	105	41,000	18,000
24SRT	70,000	55,000	13	116	42,000	.....
Alclad 24ST	62,000	41,000	18	...	40,000	.....
Alclad 24SRT	66,000	50,000	11	...	41,000	.....
25SO	26,000	10,000	20	45	18,000	9,000
25SW	48,000	25,000	18	80	30,000	14,500
25ST	58,000	35,000	20	100	35,000	15,000
A51ST	43,000	34,000	12	90	.....	.....
53SO	16,000	7,000	25	26	11,000	7,500
53SW	33,000	20,000	22	65	20,000	10,000
53ST	39,000	33,000	14	80	24,000	11,000
61SO	18,000	8,000	22	30	12,500	8,000
61SW	35,000	21,000	22	65	24,000	12,500
61ST	45,000	39,000	12	95	30,000	12,500
61S-T8	50,000	47,000	10	98	32,000	.....

*Elongation values based on $\frac{1}{16}$-in. sheet. Thin sheet has less elongation.

(T) Aging or precipitation hardening accomplished by heating SW alloys at 310° F. for 12-18 hours. Some alloys, such as 17S and 24S, age at room temperature in about 4 days.

(RT) Aged alloys that have been "worked" to increase their strength and hardness.

2. Castings—Heat-treating operations are not as clearly organized as for wrought alloys, although in general the treatments are modifications of the (O), (W) and (T) treatments, i.e., solution, quench and age treatments used on wrought alloys.

The data given in Tables 1 and 2 were taken in large part from Aircraft Materials and Processes (1941 Revised Edition) by George F. Titterton (Pitman Publishing Corp., New York).

Metallurgical Terms

Normalizing

This is a process related to annealing which involves heating to about 100° F. above the critical temperature, and cooling in still air to room temperature. With small objects normalizing results in hardening by quenching whereas when applied to large objects an annealed metal results.

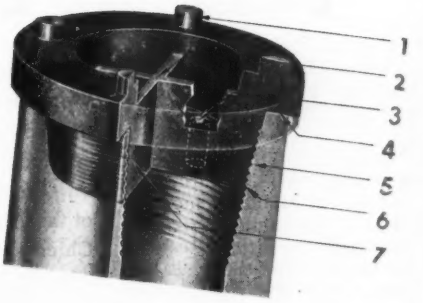
Overheating

Overheating results if the heating of a material is carried to such a temperature that while the properties of the metal are impaired, it has not been burned and can therefore be restored by heat treatment.

Look at These Features and Know *Why*

PATTERSON-BALLAGH THREAD PROTECTORS *GIVE* POSITIVE PROTECTION!

BOX END TYPE



1 MOLDED BOSSES FOR EASE OF HANDLING and reinforcement.

2 STRONG CROSS-BRACED INTERNAL RIB, for added strength, ease in making up.

3 FOUR DRAINAGE HOLES.

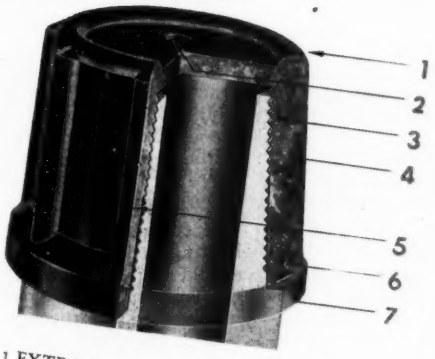
4 EXTRA THICK WIDE FLANGE SEATS FIRMLY to seal threads and for shock absorption.

5 MAKES UP FIRMLY ON STANDARD SIZES API THREADS, Regular or Full Hole, R.H. or L.H. Threads.

6 SUFFICIENT NUMBER OF THREADS TO SECURE FIRM, QUICK MAKE UP.

7 PBX SPECIAL FABRIC-REINFORCED RUBBER THROUGHOUT; water, oil, weather and abrasion resistant. Light weight, makes up and breaks out freely.

PIN END TYPE



1 EXTRA THICKNESS and CIRCULAR RIB protects pin end against damage.

2 DRAINAGE HOLE.

3 MAKES UP EASILY on Standard Sizes API Regular or Full Hole, R.H. or L.H. Threads.

4 AMPLE THREADS FOR TIGHT GRIP.

5 8 HEAVY VERTICAL REINFORCING RIBS for added strength and ease of handling.

6 WIDE SHOULDER FLANGE SEATS FIRMLY to absorb shock and seal threads.

7 PBX SPECIAL FABRIC REINFORCED RUBBER THROUGHOUT, water, oil, weather, and abrasion resistant. Light weight, makes up and breaks out freely.

PATTERSON-BALLAGH'S "BEST BET YET" for saving Tool Joints are the popular new Heavy Duty Thread Protectors. Made of tough PBX Special Rubber, they absorb shock and shield threads during handling. *They can be used over and over again.* They are made in a variety of sizes for both pin end and box end, and for R.H. and L.H. Threads. Use Patterson-Ballagh Heavy Duty Thread Protectors to prevent damage to Drill Pipe and all heavy items, such as Drill Collars, Kelly Subs, Fishing Tools, Reamers, Swivels and Bits.

Specify

PATTERSON-BALLAGH

A DIVISION OF BYRON JACKSON CO.

"Best Bet Yet"

For complete specifications see the New 1947 Catalog just off the press. Ask for your copy.

THREAD PROTECTORS

Main Office:
1900 E. 65th St.
LOS ANGELES 1 ★ **6247 Navigation Blvd.**
HOUSTON 11 ★ **808 Graybar Bldg.**
NEW YORK 17 ★ **931 Russ Bldg.**
SAN FRANCISCO 4

Typical Fractionator Control Systems

. . . and General Principles in Their Selection

by J. J. Cicalese, J. A. Davies,† P. J. Harrington,‡ G. S. Houghland,* A. J. Hutchinson,§ and T. J. Walsh¶*

This article is a section of the paper "Miscellaneous Fractionating Techniques," presented before the group session of the Division of Refining on Gasoline at the annual meeting of the American Petroleum Institute, Chicago, November 12.

IN the operation of fractionating columns, the problem of control is one that must be given considerable study, as a fractionating column can operate with efficiency only with good control. Figs. 1 through 4 show a number of standard methods of control . . . in common use. It is not intended that these control setups be taken necessarily as the proper combination for any one setup. For instance, the type of control system shown in Fig. 2 for kettle control might be combined with the system shown in Fig. 3 for pressure control, and other combinations might be worked out to meet the specific problems of any given setup.

Fig. 1 shows a typical instrumentation used in a fractionating column producing constant vapor-pressure bottoms. The vapor pressure of the bottoms is defined by the temperature and pressure in the kettle. Therefore, it is desirable that the pressure tap for control be taken from the kettle. As the composition of the bottoms is defined, the composition of the overhead must vary to accommodate variations in feed composition. To allow this condition to take place, no attempt is made to control the column-top temperature.

The reflux is controlled by a flow-rate controller. The bottoms product is controlled by a liquid-level controller with a motor valve in the outgoing fluid line. If the bottoms product from the column is used to heat the feed by means of exchangers, it is necessary that the streams be maintained as nearly constant in rate as possible in order not to vary the heat input to the feed. Referring to Fig. 1, which shows such an arrangement, it is usually advisable to use a valve positioner in valve No. 7 with a sensitive-type liquid-level controller A. Should the column be operating without a heat exchanger and feeding directly into another column, it is advisable that the same precautions be taken, on the liquid-level controller and motor valve as outlined previously.

It is generally considered good practice to put the motor valve controlling the flow of bottoms from the column on the downstream side of the heat exchangers and the motor valve on flow-rate controllers on the downstream side of the orifice.

Motor valve No. 3 controlling the heating medium to the reboiler operated by the temperature controller C should be made as nearly frictionless as possible through the use of a valve positioner. In a number of cases the preference is to use flow-rate controllers operating the motor valves, the flow-rate controllers being reset by the liquid-level controller or the temperature controller. Even if flow-rate controllers are used, bet-

*The M. W. Kellogg Co., New York. †The Texas Co., New York. ‡Standard Oil Development Co., Elizabeth, N. J. §The Fluor Corp., Alhambra, Calif., now with Fish Engineering Corp., Houston. ¶Standard Oil Co. (Ohio), Cleveland.

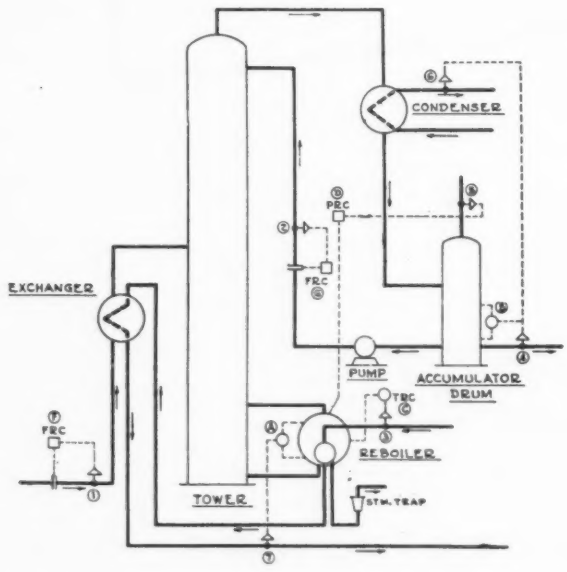


Fig. 1—Typical instrumentation used in a fractionating column producing constant vapor-pressure bottoms

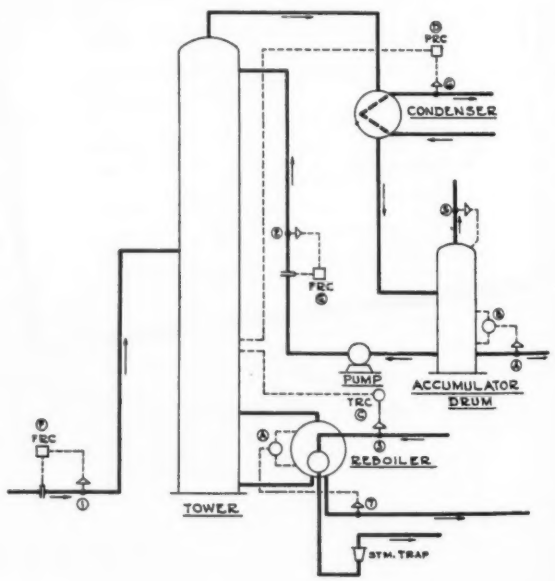


Fig. 2—Instrumentation in fractionating column producing pure product overhead. Overhead totally condensed. (Case 1)

ter operation is obtained by the use of valve positioners as well.

It will be noted that in all these illustrations the feed to the column is shown as being controlled by a flow-rate controller F actuating motor valve No. 1. Such a setup is usually desirable but often, due to other plant conditions, this type of feed-rate control is not applicable. However, in order to operate a column at high capacity and with high efficiency, it is necessary that the feed rate be maintained essentially constant.

In Fig. 1, if substantially all of the net overhead is condensed and withdrawn through valve No. 4 (operated by liquid-level controller B), and a very small amount of fixed gas is released through valve No. 5, poor pressure control will result. If this condition exists, the type of pressure control shown in Fig. 4, either with or without a pressure controller E and motor valve No. 8, would be applicable.

In Fig. 1, if it is not desired to produce liquid overhead product, liquid-level controller B can be connected to motor valve No. 6 in the water line to the reflux condenser, so that only sufficient condensation takes place to produce the desired reflux, the overhead product passing off as vapor through valve No. 5.

The control problems for columns making a substantially pure overhead product are somewhat different. Under this condition the overhead-product composition is fixed, and the bottoms product must vary as the feed composition varies. Therefore, a definite bottoms temperature with a constant pressure cannot be maintained. Under this condition, a constant column pressure can be maintained and the controls arranged so that the bottom temperature may vary to accommodate variations of feed. Fig. 2 shows one method accomplishing this result. Temperature controller C has its bulb located in the column between the feed and the bottom at the point well within a good break in the temperature gradient. As this is a point of definite composition in the column, the pressure control should be taken from this point or very close to this point. The type of pressure control shown in Fig. 2 is satisfactory and very sensitive where the rate of liquid withdrawal through valve No. 4 is greater than approximately one-eighth of the reflux pumped back over the top of the column. If the liquid withdrawal through valve No. 4 is very small with respect to the amount of reflux, this type of control becomes very insensitive, and relatively very large variations of pressure may result. Under these conditions, the type of control for pressure shown in Fig. 4 is preferable.

Fig. 3 shows a kettle controlled by the temperature taken within the break point in the temperature gradient between the top of the column and the feed. This type of control is very satisfactory provided there are not too many trays between the point of temperature control and the kettle; otherwise, the lag between the control point and the point of heat application is large, requiring a large throttling range on the temperature controller to prevent hunting. This causes the control to lack sensitivity, and it will wander far from the control point due to changes in feed rate and feed composition.

The type of pressure control shown in Fig. 3 depends on flooding the reflux condenser so that only sufficient surface is exposed to vapor condensation to give the desired rate of condensation. This method of control is subject to the same comments as given for the pressure-control system shown in Fig. 2. This control system is also subject to the further criticism that, if there is considerable excess surface in the reflux condenser and water temperatures are low, the reflux going back to the column will be substantially subcooled. This will result in converting some of the top trays in the column from fractionating trays to heat-exchange trays, with the over-all result of reducing the total number of effective trays in the column.

Fig. 4 shows a control system where no attempt is made to control the kettle temperature. This column is shown operating with a constant heat input to the kettle, and the reflux quantity is controlled by the temperature at the break point of the temperature gradient in the top part of the column. This type of control maintains a substantially constant vapor rate through the column, irrespective of normal changes of feed rate and feed composition. The type of pressure control shown in Fig. 4 is applicable to shell-and-tube-type reflux condensers, and also to atmospheric sections in a cooling tower or submerged sections in a box-type condenser.

The main column pressure control operates valve No. 9 in the vapor line between the column and the reflux

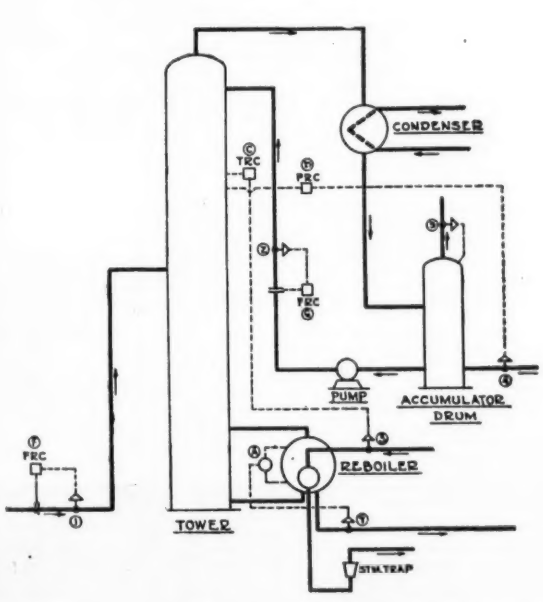


Fig. 3—Instrumentation in fractionating column producing pure product overhead. Overhead totally condensed. (Case 2)

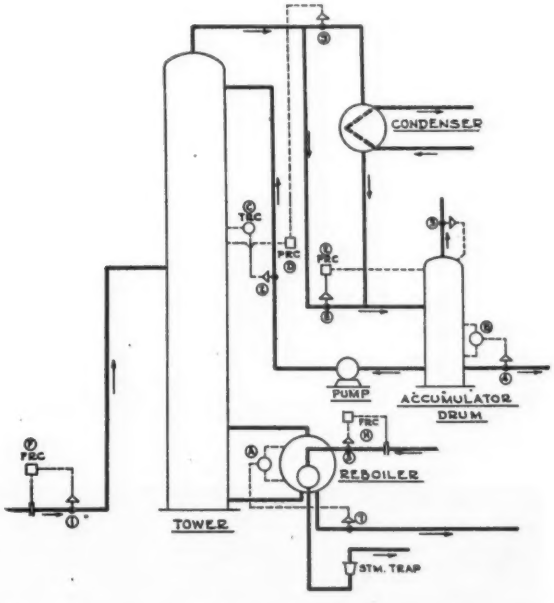


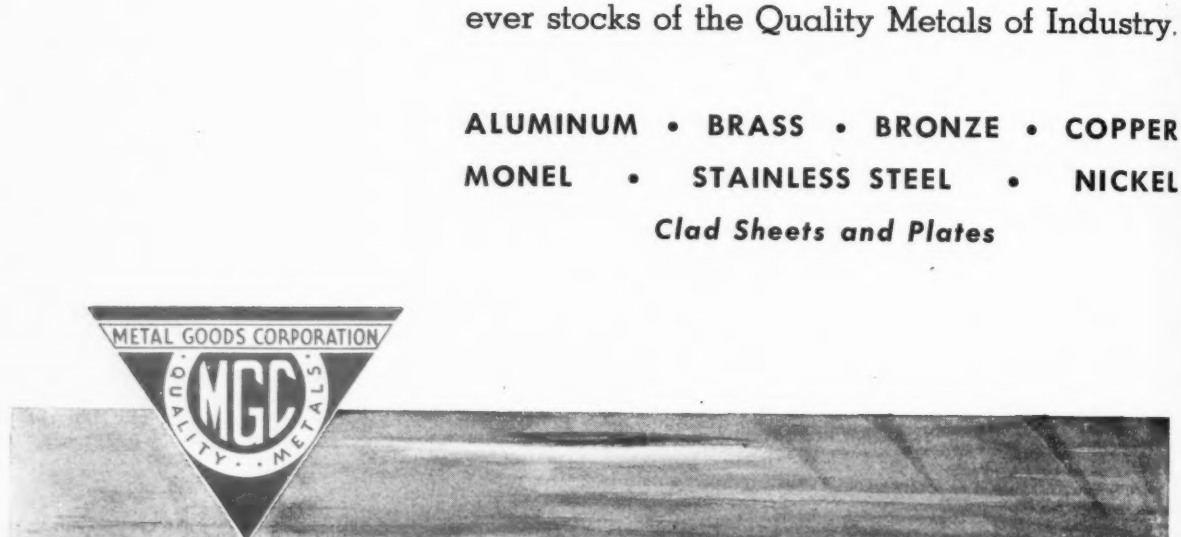
Fig. 4—Instrumentation in fractionating column producing pure product overhead. Overhead totally condensed. (Case 3)

OK Dallas...YOUR NEW METAL GOODS WAREHOUSE IS READY!

Ready with new, modern, streamlined facilities. Ready to give efficient service to the Oil and Gas Industry. Ready with greater than ever stocks of the Quality Metals of Industry.

ALUMINUM • BRASS • BRONZE • COPPER
MONEL • STAINLESS STEEL • NICKEL
Clad Sheets and Plates

METAL GOODS CORPORATION
MGC
QUALITY METALS



METAL GOODS CORPORATION

condenser. Pressure controller E, operating valve No. 8, is used to maintain a pressure a few pounds below the column operating pressure in the reflux accumulator. By bypassing hot vapors from the top of the column into this accumulator, the temperature of this accumulator will be raised above the temperature of the liquid coming from the reflux condenser. By maintaining the pressure in the reflux accumulator constant, a constant differential pressure is maintained across the reflux pump, thereby giving far more stable operation to this piece of equipment.

Selecting Proper Control System

There are certain general principles to be kept in mind in selecting the proper method of control of any process. This point of control should be selected at a point where the quantity of material handled is large, or where the change of temperature is large with respect to the change of temperature at other points. An example of control where quantities are large will be the use of a motor valve in the vapor line between the column and the reflux condenser, as shown in Fig. 4. A case where the change in magnitude is large at one point with respect to the change in magnitude at another point is taken advantage of in the control shown in Fig. 4 for the temperature in the top part of the column. If the point of control is properly selected, temperature change at this point of 5° will only represent possibly half-a-degree change at the column top. Therefore, the sensitivity of control is greatly improved. Instruments should be so selected and located that their speed of response is at least equal to the rate of change of feed compositions or feed rates. The water temperature to reflux condensers, steam pressure, or heating-medium temperature is always subject to some variation. In order to get proper control of the column, the instruments must be so adjusted that they will keep in step with these rates of changes of the utilities.

If the response of the instruments is too rapid, cycling conditions will result. These cycling conditions are due to lags.

One type of lag is that due to inertia of a large body of liquid passing through the system. If there is a long line full of liquid traveling at a relatively high velocity, and if an attempt is made to throttle this liquid, the inertia of this liquid will tend to maintain a constant velocity even with considerable throttling. Finally, the velocity is checked and the motor valve is closed beyond the point at which proper flow could normally be obtained, resulting in overshooting the mark.

The other type of lag which is encountered is temperature lag. In a column there is a large amount of metal as well as liquid that has a relatively high heat capacity. When any change of temperature occurs, the liquid and the metal must be readjusted to the new temperature condition. If the response of the instrument is too fast, over-control will result, and the system will start and continue to surge. In a great many processes, due to variations of cooling-water temperature and other causes, feed composition will vary from time to time. If instrument response is too slow, these feed-composition changes can produce surging and unstable operation throughout the process.

More Than 150 Wells Producing in Rangely

(Continued from page 86)

dle and eastern parts of the field.

Phillips Petroleum Co. 1 Levison in SE SE 27-2n-102w, near the east end of the producing area cored 625 ft. of Weber sand. According to Joseph H. Turner, regional geologist for Phillips, about 100 ft. of the 625-ft. cored interval is yielding oil. Much of the sand section penetrated by the well is impermeable; it contains many beds of dense siltstone and shale. The total section cored has an average permeability of 3.8 md. and an average porosity of 8.9 per cent. However, except for a few very thin beds, a zone 40 ft. thick has a permeability of 50 md. and a porosity of from 15 to 20 per cent; moreover, many beds of sand ranging from a few to 10 ft. thick, distributed through the 625-ft. interval, have a permeability of about 50 md. and a porosity of from 10 to 20 per cent.

The Rangely field holds promise for oil pools in beds below the Weber sandstone. A sedimentary column, chiefly of marine beds, about 2,000 ft. thick probably is present below the Weber at Rangely, and much of the sequence is prospectively valuable for oil and gas. These rocks are exposed in Hells Canyon,[3] 18 miles north of the field, where they consist of (1) an upper sequence 1,370 ft. thick of interbedded fossiliferous limestone, cherty limestone, sandstone, and a little shale, belonging to the Morgan formation of the Pennsylvanian series; (2) a sequence 470 ft. thick of limestone and dolomitic limestone that forms the Madison limestone of Mississippian age, and (3) a basal unit 100 or more ft. thick, consisting of dolomite, shale, and glauconitic sandstone of unknown age. The uppermost 350 ft. of the Morgan formation is of Des Moines age and the lower 1,000 ft. is of Lampasas and Morrow (lower Pennsylvanian) age. Only the uppermost 378 ft. of this 2,000-ft. sequence has been tested at Rangely, but doubtless all of these beds will be tested in the future.

References

1. Production data from the Colorado State Inspector of Oils.

2. Thomas, C. R., Huddle, J. W., McCann, F. T., Raman, N. D., and Johnson, C. O., Structure Contour Maps of the Rangely Anticline, Rio Blanco and Moffat Counties, Colorado: U. S. Geol. Survey Oil and Gas Inv., Preliminary Map 41, 1945.

3. Thomas, C. R., McCann, F. T., and Raman, N. D., Mesozoic and Paleozoic stratigraphy in northwestern Colorado and northeastern Utah: U. S. Geol. Survey Oil and Gas Inv., Preliminary Chart No. 16. 1945.

Producing Rate By Expansion

(Continued from page 66)

or if the pressure decline is 15-25 per cent but the fluid factor is unusually high.

The correction to be applied to cumulative oil recovery by water because of expansion is shown in the column headed CW in Table 5-1. The ΔW column shows the corrected accumulation by water for 10 per cent time intervals. The sum of the ΔW values gives W the estimated cumulative recovery by water. The last column shows the estimated recovery by expansion and water. The data of Table 5-1 are illustrated graphically in Fig. 5-6.

The end point for cumulative recovery by water is the reserve less the cumulative recovery by expansion, (100 — E) in the present example. However, when expansion causes a loss of reserve, the ultimate recovery by water is given by (100 — E —L) where L is the per cent loss of reserve.

Cumulative recovery by expansion and water usually is not separated into accumulation by expansion alone and water alone. The purpose of the corrections in Table 5-1 is to illustrate the characteristics of a cumulative recovery curve by expansion and water at a declining pressure relative to the cumulative recovery curve by water alone for no pressure decline.

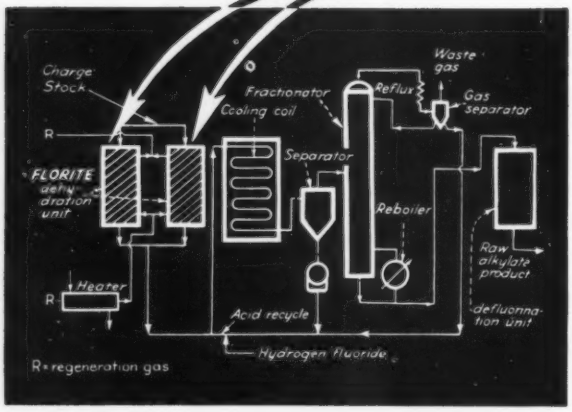
Cumulative recovery by expansion and water is higher than by water alone during the early life of a reservoir. For no less, or gain, of recoverable oil, a (W + E) curve is above a W_o curve at all points except the last one where the curves coincide. For a gain in recoverable oil, (W + E) would be above W_o even at abandonment. For a loss of recoverable oil, (W + E) is higher than W_o only during the early life of a reservoir. It crosses and falls below W_o ultimately.

Reference

1. The Oil and Gas Journal, May 5, 1945, p. 105.

HYDROFLUORIC ALKYLATION
For Aviation Gasoline

Florite*
DEHYDRATION UNIT



Industrial Advances call for More Efficient Drying Agents

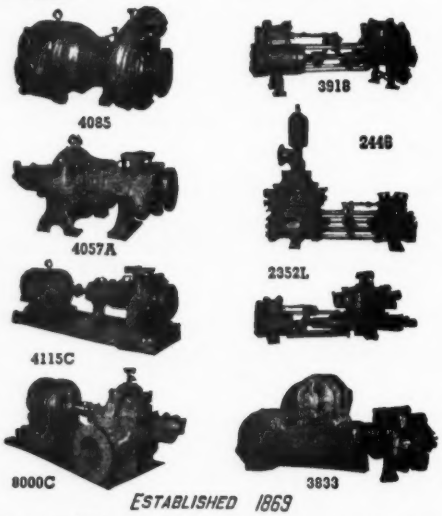
Equal or superior to other granular desiccants in drying efficiency and general performance, more economical in use because of longer life under the conditions of service involved, and lower in initial cost than most alternative materials, Florite* has rapidly found its way into exacting processes where drying agents are employed. Hydrofluoric Acid Alkylation of light petroleum fractions, represented by the chart above, is a noteworthy example. Propane, butane, air, nitrogen, carbon dioxide, refrigeration compounds, and various other fluids are successfully dehydrated with Florite. The desiccant is capable of regeneration again and again by heating to 350°F.

Made from bauxite by special processes of activation and mechanical adaptation, Florite uses no highly critical wartime materials and is therefore fully available for any users' requirements. Correspondence is invited.

*Trade Mark Registered.

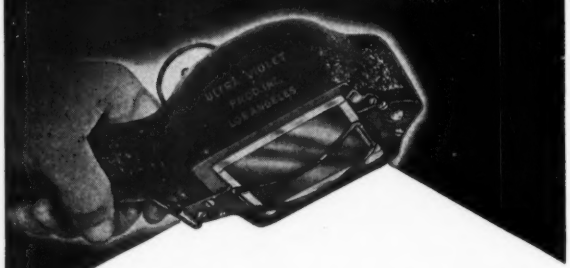
FLORIDIN COMPANY, INC.
ADSORBENTS

PUMPS
CENTRIFUGAL
RECIPROCATING
BUILDERS OF OUTSTANDING PUMPS
Since 1869



ESTABLISHED 1869
DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W TENTH ST.

in the oil industry, too!



MINERALIGHT
ULTRA VIOLET (BLACK LIGHT) LAMPS
FIND HIDDEN VALUES
instantly, easily, accurately

This ultra-violet lamp can help solve your oil testing problems . . . in the field and in the laboratory. Write today for the authoritative bulletin, *Fluorochemistry in Petroleum Science*. Learn how MINERALIGHT can be used for quick, easy petroleum identification in field and laboratory testing, and analysis of cores, sands and muds.

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Design of a Pipe Still

IN this summary of pipe-still design the titles and dates of issue of The Refiner's Notebooks that are discussed will not be given because they are listed in the box on this page.

The situation.—A small straight-up type of still (Notebook 104) is to heat 4,000 bbl. per day of 22° A.P.I. Mid-Continent from 400° to 850° F. Negligible decomposition and negligible vaporization occur. Dry cracked gas is available (1,200 B.t.u. net heating value—Notebook 105).

Pipe-still duty.—Notebook 110 of September 14 shows a specific gravity of 0.9218 for a 22° A.P.I. material. The pounds per hour:

$$4{,}000 \times \frac{42}{24} \times 0.9218 \times 8.33 = 53{,}800 \text{ lb./hr.}$$

According to Notebook 106 and No. 40 of May 5, 1945, on specific heat, the duty is (specific heat of mixed-base oil at 625° F. is 0.745):

$$53{,}800\ (850 - 400)\ 0.745 = 18{,}000{,}000 \text{ B.t.u./hr.}$$

Heat balance. (Notebook 113)—Wall losses will be about 4 per cent for this type of still, and the economical stack temperature should be about 1,100° F. The pipe-still loss when using 30 per cent air will, according to Notebook 107, be about 30 per cent.

Wall losses	4
Stack losses	30
Useful heat	66

Thus, the heat generated is:

$$\frac{18{,}000{,}000}{0.66} = 27{,}300{,}000$$

Radiant absorption.—Notebook 111 indicates an absorption rate (on projected area) of 31,000 B.t.u. per sq. ft. and a cold velocity of 7 ft. per second. The gallons per cubic foot is 7.48. The volume in cubic feet per second is:

$$4{,}000 \times \frac{42}{24} \times \frac{1}{7.48} \times \frac{1}{3{,}600} = 0.26 \text{ cu. ft./sec.}$$

Cross-sectional area of the tube is: 0.26/7 = 0.037 sq. ft. or 5.35 sq. in. Inside diameter of tube:

$$\sqrt{5.35 \times \frac{4}{3.14}} = 2.62 \text{ in.}$$

The following Notebooks pertain to Pipe-Still Design:

No. 104—Aug. 24: Arrangements
No. 105—Aug. 10: Heat of Combustion
No. 106—Aug. 17: Pipe-Still Duty
No. 107—Aug. 24: Combustion
No. 109—Sept. 7: Return Bends
No. 111—Sept. 21: Radiation Rates
No. 112—Sept. 28: Radiant Absorption
No. 113—Oct. 5: Heat Balances
No. 116—Oct. 26: Tube Diameter
No. 117—Nov. 2: Still Dimensions
No. 119—Nov. 16: Convection Rates

A 2¾-in. i.d. tube will be used and an outside diameter of 3½ in. will be satisfactory (Notebook 116). According to Notebook 109, a block-type bend with a 5¾-in. center-to-center spacing can be had. To compute the percentage of heat absorbed in the radiant section (Notebook 112) the following constant is necessary:

$$q\ D/C = 31{,}000 \times \frac{2.75}{5.75} = 14{,}300$$

With 30 per cent air the radiant absorption is 53.5 per cent.

	Per cent
Efficiency	66.0
Radiant	53.5
Convection	12.5

The projected area of effective radiant tubing and the length of tubing should be:

$$\frac{27{,}300{,}000 \times 0.535}{31{,}000} = 470 \text{ sq. ft.}$$

$$470 \times \frac{12}{3.5} = 1{,}615 \text{ ft.}$$

If an effective tube length of 24 ft. is used (Notebook 117) so that the flue-gas velocity will be reasonably high, the number of tubes is:

$$\frac{1{,}615}{24} = 68 \text{ radiant tubes}$$

Convection section.—If the still is 6 ft. wide inside, the number of tubes across the convection section will be about:

$$\frac{5 \times 12}{5.75} = 10.0$$

Free area for flue gas:

$$\left(5 - \frac{10 \times 2.75}{12}\right) 24 = 65 \text{ sq. ft.}$$

The cubic feet of fuel required is: 27,300,000 ÷ 1,200 = 22,800 cu. ft./hr. or 6.32 cu. ft./sec.

and the volume of flue gas at 60° F. (Notebook 105) with 30 per cent excess air:

$$6.32\ (1 + 12.34 \times 1.3) = 108 \text{ cu. ft. per sec.}$$

The temperature of the flue gases entering the convection section can be read from Notebook 107. The percentage of heat left in the flue gases is 100 minus 53.5 and minus 2 (radiant wall loss) or 44.5 per cent and the temperature for 30 per cent excess air is 1,550° F. The average flue-gas temperature, and the volume of flue gas at this temperature are:

$$\frac{1{,}550 + 1{,}100}{2} = 1{,}325° \text{ F.}$$

$$108 \times \frac{460 + 1{,}325}{460 + 60} = 370 \text{ cu. ft./sec.}$$

The flue gas velocity is:

$$370/65 = 5.7$$

and the convection rate (Notebook 119) at 1,350° F. is about 6.25. The temperature of the oil out of the convection section will be about:

$$400 + \frac{0.125 \times 27{,}300{,}000}{53{,}800 \times 0.65} = 498° \text{ F.}$$

and the log mean temperature difefrence (Notebook 75, January 5, 1946) is:

$$\frac{(1{,}550—498) — (1{,}100—400)}{\ln 1{,}052/700} = 864° \text{ F.}$$

The outside area of the convection tubing should be:

$$\frac{0.125 \times 27{,}300{,}000}{864 \times 6.25} = 632 \text{ sq. ft.}$$

The effective length and number of tubes will be:

$$632 \times \frac{12}{3.5 \times 3.14} = 690 \text{ ft.}$$

$$690/18 = 38 \text{ tubes}$$

No. 121 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

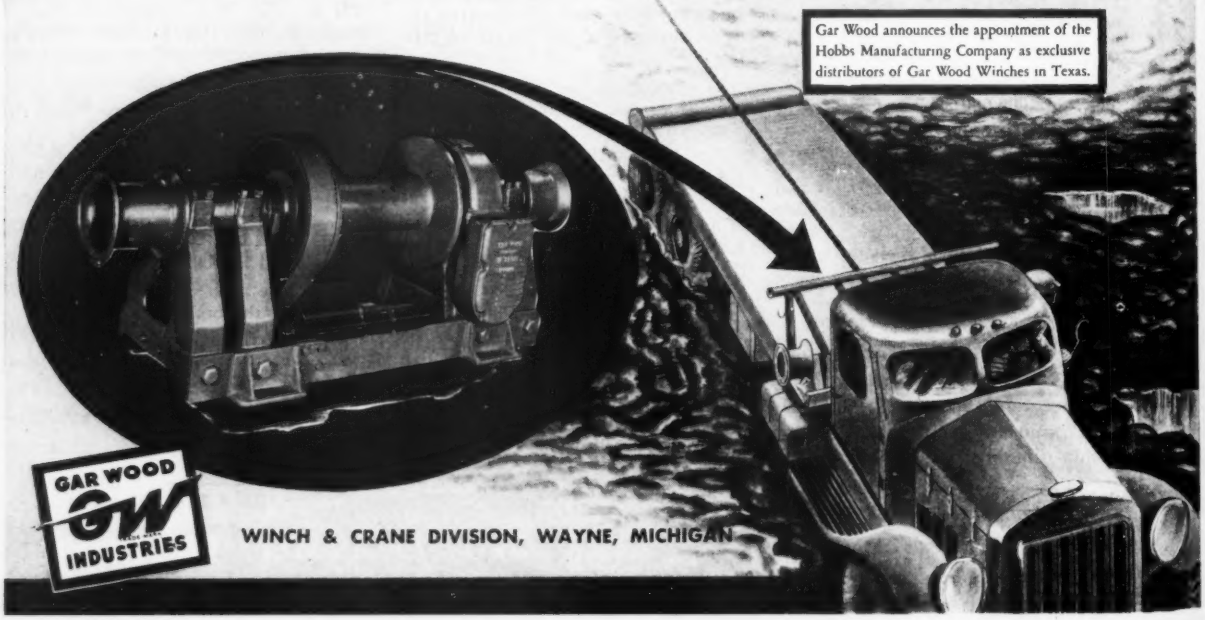
When the job is *really tough* . . . when you're skidding derricks across the field . . . bulling heavy machinery onto bodies . . . or hauling thirty-ton trucks out of cab-deep mud . . . that's where you need a winch with plenty of *muscle . . . plenty of guts!*

You've got to have a dependable, *rugged* winch that's *built to take a beating* . . . safely. And that's where Gar Wood comes in. Because Gar Wood designs, engineers, and builds winches for the *toughest* kinds of hoisting jobs. They're built to work *without any trouble* under the worst possible conditions. They've been proven in oil fields the world over. They've *got* to be good!

And they *are* good! Take the Gar Wood 7MBD (illustrated) . . . the biggest truck winch in the world. 4¼" drumshaft handles a 75,000 lb. load . . . easily. Full cab control of jaw clutch and brake, brake band on drum flange, and automatic safety brake on worm shaft. Power? To spare!

For your own good . . . specify *Gar Wood!*

Gar Wood announces the appointment of the Hobbs Manufacturing Company as exclusive distributors of Gar Wood Winches in Texas.



GAR WOOD GW INDUSTRIES

WINCH & CRANE DIVISION, WAYNE, MICHIGAN

Engineering Fundamentals

No. 262

A FEATURE OF THE OIL AND GAS JOURNAL

Sodium Zeolite Water Softening

ZEOLITES are solid substances of a complex chemical structure which possess the property of reacting with various ions in water with which they come in contact. The chemical reactions involved are those of replacement; that is, certain ions are removed from solution and are replaced with an equivalent amount of another ion of like charge.

Sodium zeolite softening deals with the particular reactions of zeolitic materials in which all cations of two or more positive charges are removed from solution and are replaced by sodium ions. The two principal cations removed from normal water supplies are calcium and magnesium. When zeolites react in this way, they are said to be operating in the sodium cycle and are known as sodium zeolites. This is, by far, the most common zeolite reaction used today and is generally the one referred to when the term "zeolite softening" is used without further qualifications.

Use or Purpose

From the above it can be seen that the main function of sodium zeolites is to soften water. In other words, the use of sodium zeolite permits the replacement of polyvalent positive ions with sodium ions. Thus it can be said that these zeolites possess the property of removing incrusting solids from solution, replacing them with non-incrusting solids. It can also be said that these zeolites possess the property of removing the soap-consuming power of water inscfar as soap consumption is a measure of hardness. These are all various ways of saying the same thing, namely that sodium zeolites possess the property of softening water.

Chemistry Involved

Zeolites are of a complex chemical structure and usually consist of sodium aluminum silicate. Carbonaceous zeolites, a newer development, are made from a sulfonated coal and can also be operated in the sodium cycle.

Regardless of how the zeolites are produced, all operating in the sodium cycle contain a complex molecule with sodium attached. Accordingly, it is thus possible to represent sodium zeolite in a chemical equation by using the symbol Na_2Z where Na stands for the sodium and Z for the complex zeolite radical. For simplification in the following reactions the calcium (Ca^{++}) in solution will be considered as representing all the hardness. The following is therefore the fundamental reaction in sodium zeolite softening:

$$\underset{\text{calcium ion}}{Ca^{++}} + \underset{\text{sodium zeolite}}{Na_2Z} = \underset{\text{calcium zeolite}}{CaZ} + \underset{\text{sodium ion}}{2Na^{++}} \quad (1)$$

(Whether the zeolite radical is univalent, divalent, or polyvalent is immaterial for this discussion.)

When this reaction has proceeded to the point where the zeolite will release no more sodium in exchange for calcium, it becomes necessary to regenerate the zeolite bed. This is accomplished by washing with a strong salt solution (sodium chloride). The high concentration of the sodium ion in the salt solution reverses the above reaction resulting in a regeneration of the zeolite bed. This reaction for regeneration may be written thus:

$$\underset{\text{calcium zeolite}}{CaZ} + \underset{\text{sodium chloride}}{2NaCl} = \underset{\text{sodium zeolite}}{Na_2Z} + \underset{\text{calcium chloride}}{CaCl_2} \quad (2)$$

The calcium placed in solution by this regeneration is run to waste as calcium chloride. The fundamental chemical principle of mass action determines if the reaction proceeds as in reaction 1 or reaction 2. In the softening action where the calcium ions predominate the reaction proceeds as in 1. In the regeneration reaction where the sodium ions predominate then the reaction proceeds as in 2. The net result is that sodium chloride (common salt) has been consumed and hardness has been removed from solution. As it is necessary to have an excess of salt present for regeneration, an equivalent amount of hardness is not removed for a given amount of salt consumed.

The capacity of zeolites, that is, the amount of hardness that can be removed before regeneration will vary greatly. The synthetic zeolites generally have a higher exchange capacity than the natural zeolites, but are more expensive per unit volume. The capacities for synthetic zeolites range between 6,000 and 12,000 grains per cubic foot. Natural zeolite capacity varies between 2,500 and 5,000 grains per cubic foot depending on the processing.

The effluent from a zeolite softener will rise quite rapidly in hardness as it approaches the limits of its capacity. In some cases where minimum hardness is essential, the softener will be regenerated before it reaches this point. In other cases the hardness is allowed to rise only to a predetermined level before regeneration. By using greater quantities of salt for regeneration the capacity of the softener can be increased somewhat, but beyond a certain point the increased capacity is unjustified due to increasing salt consumption entirely out of proportion of the increased yield from the softener. A balance is generally applied which calls for the use of approximately 0.5 lb. of salt per thousand U. S. gallons for every grain of hardness removed calculated in grains per U. S. gallon. By conversion this is equal to 3.5 p.p.m. of salt required for regeneration for each part per million of hardness removed, or 1 lb. of hardness removed by the softener will require 3.5 lb. of salt for regeneration.

Equipment Employed

Although there are different modifications, in general the softener consists of a steel shell, the bottom of which contains graded sizes of gravel. Above the gravel is located the zeolite, usually 30 in. or more in depth. In the majority of softeners the water enters the top of the tank and passes down through the zeolite. Size of the zeolite bed will depend upon the exchange capacity of the zeolite, the hardness of the water being treated and the amount of water to be softened between regenerations. The bed must also be of sufficient size to allow proper contact time between the water and the zeolite and is usually regulated at 5 gal. per sq. ft. per minute. In addition it is necessary to have a tank to hold the salt solution for regeneration, proper control valves and interconnecting piping.

This material is from the Betz Handbook for Industrial Water Conditioning, written and published by W. H. and L. D. Betz, consulting engineers, Philadelphia.

For emergency installations use Bitumastic No. 50 for spot reconditioning

"On the spot" reconditioning of pipe lines with Bitumastic No. 50 is an economical procedure widely employed by many companies on transmission and distribution lines.

Applied in two coats alternated with a fabric membrane laid longitudinally along the pipe, Bitumastic No. 50 makes a firm bond without a primer. It can be applied in an unusually thick film either by brushing, or, where clearance is insufficient for brushing work, by wiping on with gloved hands. Bitumastic No. 50 is used on emergency installations where the work must be done in a short time, or where a hot coating is not considered necessary.

For regular coating work where maximum protection is the principal consideration, Bitumastic Enamel is recommended.

BITUMASTIC ENAMEL

Wailes Dove-Hermiston Corporation

A SUBSIDIARY OF KOPPERS COMPANY, INC.

K KOPPERS

NEW YORK 4 · PHILADELPHIA 5 · CLEVELAND 14 · CHICAGO 4
HOUSTON 3 · TULSA 3 · MIAMI 34 · SAN FRANCISCO 10 · LOS ANGELES 1

timely message

FOR OIL COMPANY AND PROCESS INDUSTRY EXECUTIVES

SEE PAGE 30

ROOFING and SIDING ALUMINUM

• A new type of roofing and siding material is now ready for immediate shipment. This material is manufactured from weather resistant aluminum and is designed to give longer, better and cheaper service.

- FOR TEMPORARY OR PERMANENT BUILDINGS
- EASE OF USE SAVES TIME
- LIGHT WEIGHT
- RUST PROOF — DURABLE

The following sizes and types are available in our warehouse:

TYPE

5 V — Crimp
1¼" Corrugation
2½" Corrugation

SIZES

26" x 72" .027" Thick
26" x 96" .027" Thick
26" x 120" .027" Thick
26" x 144" .027" Thick

Contact us for prices F.O.B. Kansas City, Mo., and quantity discounts.

GILLHAM SALES

1020-22 Oak St., KANSAS CITY 6, MO.

Phone Victor 1041-2-3

PIPE LINES

Whiting-Moorhead Products Line Nearing Completion

Laying of pipe line 662 miles long to carry petroleum products from Whiting, Ind., refinery of Standard Oil Co. (Ind.) to Minneapolis - St. Paul and Moorhead, Minn., is nearing completion. The line will serve northern Illinois, northeastern Iowa, southern and western Wisconsin, the greater portion of Minnesota, and most of North Dakota with gasoline, kerosene, tractor fuel, fuel oil, and heater oil. From Whiting to Minneapolis the line is 10 in., and from Minneapolis to Moorhead 8 in. Construction of the system was started in August and is scheduled for completion by early 1947.

There will be pumping stations at Joliet, Ill., Dubuque, Iowa, and Osseo, Minn., near Minneapolis. Each will be operated by a staff of five men.

Distribution terminals and plants are to be built at Rochelle, Ill.; Dubuque, Iowa; Spring Valley, Minn.; and Moorhead. From these, transport trucks and railway tank cars will carry products to surrounding supply points.

At Rochelle the 40-acre site will comprise seven tanks with a total capacity of 140,000 bbl. There will eventually be also an office building about 50 ft. by 100 ft. in size and loading docks for both tank cars and trucks.

At Dubuque, workmen are preparing to erect seven tanks of 193,000-bbl. total capacity. A permanent office building, as well as the pumping station for the pipe line itself, will be constructed.

At Spring Valley a rail siding has been laid, loading docks are under construction, and work is beginning for seven tanks with combined capacity of more than 200,000 bbl. The Minneapolis plant is to have eight tanks with a capacity of nearly 400,000 bbl., an office building, and a warehouse and necessary shops. Work is proceeding on the rail spur which will connect the terminal with railway lines.

At the distributing plant at Moorhead, which is to serve that city, Fargo, N. D., and surrounding points the railroad loading dock is nearing completion. Water service lines have been put in. There are to be seven tanks of 285,000-bbl. capacity at Moorhead.

In the construction of the terminals careful consideration has been given to the use of nonhousing type of materials and equipment, all construction is proceeding under veteran housing program order for conservation of housing materials, the company said. On all the plant building projects difficulties are being experienced because of slowness of delivery of construction materials.

Shell to Build Lateral To Receive Van Crude

DALLAS.—Shell Pipe Line Corp. announced plans for construction of an 18-mile, 4-in. lateral connecting Douglas station on its 10-in. Houston trunk line with the Rusk, Tex., station of Pure Oil Co.'s 10-in. Van-Smith's Bluff line.

The new line will enable Shell to receive crude from Van field of East Texas. Shell sells 500 bbl. of Van crude to Pure daily and controls some 3,000 bbl. daily from the field with the remainder going to the Gulf Coast through Pure's pipe line. When the new lateral goes into operation, Shell

WHEN YOU WANT The Best IN PIPELINE CONSTRUCTION

OKLAHOMA CONTRACTING COMPANY

DALLAS TEXAS

SOUTH AMERICA
APARTADO 1085
CARACAS, VENEZUELA

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston-Tulsa

ANDERSON BROTHERS
Pipe Line Contractors and Engineers
707 NORTH DRENNAN
HOUSTON, TEXAS

. . . . . with MODERN, EFFICIENT EQUIPMENT . . . AND PLENTY OF IT!

above all EXPERIENCE

Not just Contractors

just PIPE LINE SPECIALISTS

CORROSION PREVENTION

• These protective materials for all types of structures, above and below ground, have been proved by years of service to effectively prevent corrosion under most severe conditions. Order them for your next job.

BITUMASTIC

• Hot applied pipe line coating.
• Cold applied coating and paints.

Carey

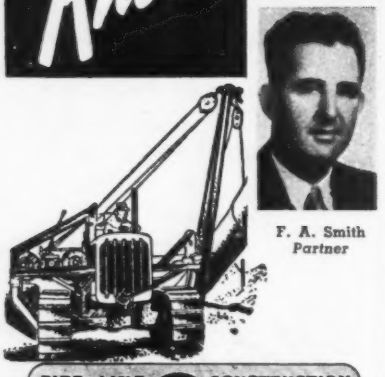
• Asbestos pipe line felt.

These corrosion prevention products are distributed in Texas and Louisiana by:

James E. MAVOR

514 M & M Building Capitol 2203
Houston 2, Texas

PIPELINE "Know-how"



F. A. Smith
Partner

PIPE LINE CONSTRUCTION
COMPRESSORS WELDERS
DITCHERS TRUCKS
DOZERS TRACTORS

SMITH CONTRACTING COMPANY
ODESSA, TEXAS

MAIN BUSINESS OFFICE
FORT WORTH NATIONAL BANK BLDG.
FORT WORTH 2, TEXAS

will take 2,500 bbl. daily into its carrier. A new 5,000-bbl. storage unit will be built at Douglas station for accumulation of stocks moving to Houston.

Stanolind to Accelerate 20-In. Pipe-Line Program

Stanolind Pipe Line Co. will lay 200 miles more 20-in. pipe in 1947 than was contemplated at the time that the company's crude-oil pipeline expansion program was announced by F. O. Prior, chairman of the board, and Bruce C. Clardy, president (The Oil and Gas Journal, page 158, November 16). Specifications recently issued for 119 miles of 20-in. loops between Drumright, Okla., and Freeman, Mo., have been recalled.

New specifications and bid sheets are being sent to contractors this week for the construction of a 20-in. line for nearly the entire Drumright-Freeman section for a distance of approximately 319 miles. Bids are to be submitted about the middle of December. It is expected that work will start about February 1.

During the summer the company plans to lay the LaPlata, Mo.-Manhattan, Ill., 163-mile 20-in. crude-oil line.

The company's present main-line system to Whiting, Ind., has a capacity of 170,000 bbl. daily. When the entire 20-in. expansion program, which was announced early this month, is completed, the capacity of the system will be raised to such an extent that the company plans to shut down every other station for operating at a maximum throughput of 250,000 bbl. daily. The shut-down stations will be maintained so that Stanolind would be in a position to pump a total of 380,000 bbl. daily by using all stations and operating some additional pumping equipment which has not yet been installed.

The Stanolind construction program for the Rocky Mountain area will probably be postponed until 1948. This includes the Rangely-Wamsutter 12-in. and the Wamsutter-Casper 20-in. crude-oil lines. Acting as agent for Wyco Pipe Line Co., Stanolind will build a 267-mile products line. Instead of extending only to Cheyenne, Wyo., as indicated on the map (The Oil and Gas Journal, page 117, November 23), this line will traverse the entire route from Casper to Cheyenne and Denver. Wyco is owned by Standard Oil Co. (Ind.), The Texas Co. and Socony-Vacuum Oil Co., Inc.

Humble Plans Crude Line

Completion by Humble Pipe Line Co. of a new, 41-mile line to handle Ordovician sweet crude oil in West Texas is expected before January 1. The new line will include 29 miles of 6-in. pipe originating at Martin pool and 12 miles of 4-in. pipe making deliveries to the Wink terminal.

Compressor Station Construction Begun

Construction of a $1,000,000 compressor station is under way near Victoria, Tex. Scheduled for completion within 12 months, the station is a part of a $31,000,000 expansion program of Tennessee Gas & Transmission Co.

Similar stations are to be built at Cleveland, Tex., and Nachitoches, La., and 400 miles of loop line are being laid to permit an increase of about 40 per cent in the company's transmission capacity.

S. E. HUEY
CONSULTING ENGINEER

PIPE LINE
LOCATION SURVEYS
&
RIGHT-OF-WAY MAPS

OUACHITA BANK BLDG.
MONROE, LOUISIANA

Pipeline PERFECTION

PIPELINE PERFECTION IS THE RESULT OF 80 YEARS EXPERIENCE AMONG OUR THREE KEY MEN AND 90% NEW AND MODERN EFFICIENT EQUIPMENT

A CONTRACT WITH MB MEANS "PIPELINE PERFECTION"

MB

MORRISON BROS. CONSTRUCTION COMPANY INC.
GENERAL PIPELINE CONTRACTING
P.O. BOX 384 ODESSA, TEX. PHONE 1640

WELL-KNOWN SIGNS

IN THE SPORTS WORLD *Geese Flying Low* A SIGN OF GOOD HUNTING

IN THE OIL WORLD...

A SIGN OF GOOD SERVICE

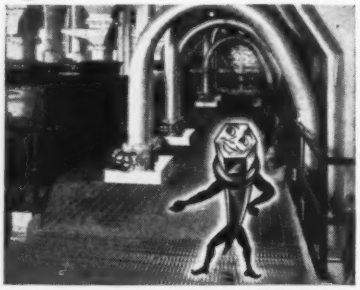
▲ The Continental "Green Triangle" is accepted by men of the oil industry as being an insignia denoting quality equipment and good, dependable service . . . two "musts" for greater efficiency in operation. Such combination of *quality* and *service* would naturally make the familiar "Green Triangle" not only a well-known but a looked-for sign.

CONTINENTAL

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS • EXPORT DIVISION: 30 Rockefeller Plaza, NEW YORK, N. Y.
Representatives: ARGENTINA • BOLIVIA • BRAZIL • CHILE • COLOMBIA • ENGLAND • JAVA • MEXICO • PERU • TRINIDAD • VENEZUELA

BATES • GRATES

fit into every plant picture



If yours is an application like this — with pipes, installations and stairways cutting into the area— BATES • GRATES give you neat, safe and strong open steel flooring.

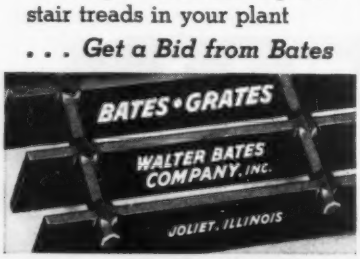
Here's where BATES • GRATES win universal approval — a series of stairways combined with short walkways. Safety, strength and plenty of light and ventilation all the way down.

YOU can use BATES • GRATES for flooring any area or running any stairways. They serve to advantage in many ways: They are strong, safe, easy to maintain, durable, provide maximum lighting and ventilation.

The simple directness of BATES • GRATES engineering accounts for these advantages. The key is the Hex Cross bar "cemented" by a fillet-weld to stout main bars.

For open steel flooring and stair treads in your plant

. . . Get a Bid from Bates



REFINING

Mid-Way Line to Relieve Kansas Crude Shortage

FOR constructing Mid-Way Pipeline Co.'s project from West Texas and Southeast New Mexico to serve Mid-Continent independent refineries Sen. Carl A. Hatch (N.M.) is requesting Civilian Production Administration priorities to procure steel pipe.

Total tonnage for the main Fullerton, Tex.-Valley Center, Kans., line and extensions has been estimated as 67,022.75 tons. Proponents of the project, E. H. Hatcher and W. H. Black, state the line should be of sufficient size to take care of anticipated requirements in the near future as well as immediate needs. It is asserted that a delay of 6 months or a year due to an apparent inability to obtain pipe would seriously effect the welfare of independent refineries.

In surveying the crude-oil situation facing a group of 14 refineries, estimates of shortages were made in barrels daily as follows: Emergency shortage, 23,000 bbl.; present shortage, 38,300 bbl.; anticipated shortage, 42,000 bbl. By anticipated shortage is meant the additional amount of crude required to keep its plants in operation at minimum capacity. Present shortage refers to the additional crude oil needed by the refineries now or by the first of the year. The anticipated shortage is predicted for the next year.

Refineries included in the survey include Wood River Oil & Refining Co.; National Cooperative Refinery Association; Bay Petroleum Corp.; Vickers Petroleum Co., Inc.; Cooperative Refinery Association (Phillipsburg, Coffeyville and Scotts Bluff plants); Derby Oil Co.; Bareco Oil Co.; El Dorado Refining Co.; Kanotex Refining Co.; Midland Cooperative Wholesale; Rock Island Refining Co., and Wilcox Oil Co.

In addition to the present emergency shortage indicated above, the survey showed the crude-oil shortage promises to grow more acute without prospects of improvement unless new sources of crude becom available. A substantial number of refineries are operating on short-term contracts. A large number of independents are reported to be processing crude oil for major companies on a temporary basis.

The Mid-Way project proposes to blend sweet crude from West Texas (with low octane numbers) with sour crude from Southeast New Mexico (with high octane numbers) in proportions which will be suitable for refinery requirements. Early requirements of independent refineries to be met by Mid-Way are estimated as 30,000 bbl. daily to be drawn from the following areas: Southeast New Mexico, 15,000 bbl.; Fullerton area and South, 7,000 bbl.; Post area, 4,000 bbl.; Wichita Falls area, 4,000 bbl.

It is also anticipated that major companies will desire to utilize the line to transport their own production from the following sources: Southeast New Mexico, 5,000 bbl. daily; West Texas, 10,000 bbl.; Wichita Falls area, 5,000 bbl.

Humble Butadiene Plant Termed One of Safest

WASHINGTON. — Credited by the Department of Labor as one of the safest plants in the synthetic-rubber industry is the butadiene plant operated by Humble Oil & Refining Co. at Baytown, Texas.

The plant safety record, set in 1944, showed an accident frequency of 0.9 per 1,000,000 man-hours for a total of 1,077,687 elapsed man-hours durthe year. The injury frequency in all American rubber plants during that year was 8.2 per 1,000,000 man-hours, compared to 10.06 for the chemical industry and 12.73 for the petroleum industry.

Gasoline Consumption Shows Marked Gain

Daily consumption of gasoline jumped 11.27 per cent during the

OIL and GAS BURNING EQUIPMENT

NATIONAL AIROIL BURNERS

1236 E. Sedgley Ave.
PHILADELPHIA 34, PENNA.

first 8 months of 1946, the American Petroleum Institute reports.

From January 1 to September 1 the United States consumed an average of 81,343,000 gal. daily, against a daily average of 73,104,000 gal. during the same period in 1945.

Texas, showing the loss of some of its wartime business, declined 54.46 per cent in its gasoline consumption, while Vermont registered the highest increase with a gain of 52.73 per cent. Among the major states, Pennsylvania led the consumption increase in the 8-month period with a 33.91 per cent jump.

British American Sets Canadian Safety Record

TORONTO.—A new safety record in the Canadian oil industry was set by the British American Oil Co., Ltd., with the completion of 1,000,000 manhours without a lost-time accident at the Clarkson, Ont., refinery.

Setting of the new record coincided with the third anniversary of the opening of the refinery. All employes were awarded an extra day's pay in recognition of their cooperation in the refinery's accident-prevention program.

Powerful Diesel Engine Passes Test at Sea

SAN FRANCISCO.—The most powerful single-acting diesel engine ever built in America recently completed its sea trials in the M. S. Emory Victory, R. W. Bayerlein, manager of the heavy machinery division of Nordberg Manufacturing Co., Milwaukee, told registrants at the recent San Francisco Marine Conference.

The engine is rated at 6,000 hp. and is capable of delivering 10-per cent continuous overload. It weighs 350 tons and, Bayerlein said, operated during tests on a fuel consumption of 0.34 lb. of fuel per hp. hour.

Propane Gas New Aid in Salad Oil, Soap Production

Use of liquefied propane gas to convert waste fish oils and farm products into salad oils, fats for soap, drying oils for paints, and vitamins features a new development announced last week by M. W. Kellogg & Co.

Five new plants, Kellogg said, now are under construction to adapt the new refining technique to commercial production. In the system, the liquid gas mixes with the oils and dissolves out the various ingredients, one by one. At the end of the process pressure is removed and the solvent evaporates as a gas, ready for reuse.

Kellogg said the revolutionary process should save millions of dollars annually in refining of about 25 basic vegetable, animal, and marine oils and fats.

New Spray Developed

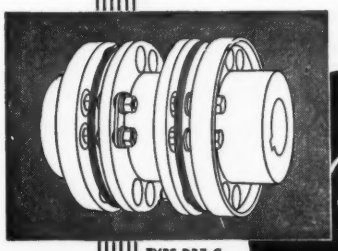
A new antifungus agricultural chemical derived from petroleum and sulfur is being placed on the market by B. F. Goodrich Chemical Co. The chemical, polyethylene polysulphide, forms a rubbery film sealing out insects and fungus growths when sprayed on trees and plants. W. S. Richardson, company president, says tests have shown that when applications are discontinued 6 weeks before harvest, no odor, taste, or other evidence of the spray remains on the fruit or vegetable to lower their market value.

Catalytic Firm Moves

PHILADELPHIA.—Due to expansion of activities, the recently organized Catalytic Construction Co. has consolidated its executive and engineering headquarters, T. Ellwood Webster, president, explained. The new address will be 1600 Walnut Street, Philadelphia.

Previously, executive offices were at 1608 Walnut and engineering offices in Philadelphia's Lewis Tower.

THOMAS
Flexible COUPLINGS
FOR HOT OIL PUMP DRIVES or any other service where 100% dependability is demanded



THOMAS Flexible COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float . . . and Eliminate BACKLASH, FRICTION, WEAR and CROSS-PULL
NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

Write for Complete Engineering Catalog!

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

NATURAL GAS

Marsh Closes Natural-Gas Shortage Hearing

WASHINGTON. — Examiner Edward Marsh, closing a Federal Power Commission hearing on emergency regulations to avert an acute natural-gas shortage in eight states, said an order intended to assure a maximum supply during the winter might be issued by December 1.

The hearing resulted from protests against a plan of Panhandle Eastern Pipe Line Co. to reduce service to industrial customers whose contracts do not call for constant year-around supply. Panhandle maintained that during the peak consumption in cold weather as many as a dozen towns might be without natural gas if it were not permitted to cut down on its delivery of gas to certain industrial consumers.

Capacity of the company is 400 million cubic feet a day. It has applied for authority to increase its capacity 90 million cubic feet a day, but spokesmen said this could not be done in time to avoid a shortage this winter,

. Objections to the Panhandle curtailment plan were raised by wholesale companies in Texas, Oklahoma, Michigan, Ohio, Kansas, Missouri, Indiana, and Illinois which buy fuel from Panhandle for resale.

North Louise Field Put Under Disputed System

AUSTIN. — The Texas Railroad Commission has instituted in North Louise field of Wharton County a system of prorating gas from unconnected wells similar to that attacked in injunction suits by operators in Carthage field. The commission was enjoined from enforcing its Carthage field order in an action by the 126th Texas District. Court. A second suit is pending.

Principal production in the North Louise field is from three wells flowing from a sand at 4,100 ft., while Ralph A. Johnson, owner of two other wells, has no market for his production. Johnson requested that total outlet from the field be allocated among all wells, which, it was said, would mean that eventually such unconnected wells would acquire the entire field's allowable.

The commission adopted Johnson's proposal, and new rules provide that daily allowable production of gas will be prorated two-thirds on acreage times bottom-hole pressure, and one-third on initial potential.

German Synthetic Studies To Help U. S. Producers

CLEVELAND.—Use of gas acetylene, made from coke and limestone, will mean millions of dollars to American manufacturers, believes Dr. O. J. Grummitt, assistant professor of chemistry at Western Reserve University and research consultant for Sherwin-Williams Co.

Dr. Grummitt, who recently returned from a government-authorized trip to Germany, said the methods found by the Germans of producing hundreds of synthetics from gas acetylene, possible through a discovery enabling them to keep the substance from exploding under pressure, constituted that country's greatest wartime achievement. The German developments were required, he said, because of that country's shortage of oil, which the United States used as a basic product for the manufacture of synthetics.

Three Gas-Line Projects Involved in FPC Hearing

A pipe-line issue involving three companies now serving or seeking to serve hundreds of middle-western communities with natural gas opened in Kansas City, Mo., early this week before the Federal Power Commission.

It will be a composite hearing at which the applications of the companies to construct and extend gas transmission lines will be considered. At stake, as far as two of the companies are concerned, is the use of the Southwest Kansas Hugoton gas field as a source of supply.

Cities Service Gas Co. seeks permission to construct a new 26-in. line from Hugoton to Kansas City at a cost of approximately $30,000,000.

Mid-Continent Gas Transmission Co., St. Paul, Minn., seeks a permit to construct lines of varying sizes and capacities from Liberal, Kans., near the Hugoton field, to St. Paul at a cost of $78,853,500.

Northern Natural Gas Co. of Omaha, Neb., seeks authorization for extensive additions on its pipe-line facilities at a cost of $12,715,931.

Kansas City, which now obtains its gas from a company served by the Cities Service Co., has intervened in both the Cities Service and Mid-Continent petitions.

Carbon-Black Plant Permit Hearing Set

AUSTIN.—The question of renewal of operation permits of all Texas carbon-black plants will be studied at a hearing of the Railroad Commission December 19.

Plant operators have been ordered to submit data on daily average amount of gas consumed, recovery of carbon black per 1,000 cu. ft. of gas, and the B.t.u. content of gas being used to the commission before December 12.

In a statement last week, Commissioner E. O. Thompson, expressing concern over the low price paid for gas by the carbon-black manufacturers, suggested that both sweet and sour gas be rated equitably and prorated alike to give other purchasers a chance to compete for it.

Proposals have been made for repeal of the sour-gas conservation law, Article 608A of the oil and gas statutes, which limits production of this gas to 750,000,000 cu. ft. per day.

United Natural Gas Line Completion Expected Soon

BRADFORD, Pa. — Completion of the 19-mile 12-in. gas pipe line from Lewis Run to the Lamont station of United Natural Gas Co., 5 miles south of Kane, Pa., is expected before Christmas.

The $250,000 construction project was slowed at the start by rainy weather, but contractors rushed efforts to get ditch digging completed before heavy ground freezes.

Gas Prices Raised

In an amendment to existing contracts with Shamrock Oil & Gas Corp., Columbian Carbon Co. has agreed to new price schedules considerably higher than those previously in effect for natural gas used in the production of carbon black. Although not announced publicly, the prices were reported as almost doubling previous prices.

Rate Change Suspended

WASHINGTON. — A railroad rate change which would have figured liquefied petroleum gas at more than 6 lb. per gal. instead of 4.7 has been suspended by Interstate Commerce Commission pending an investigation. The I.C.C. also suspended a rate change which would have placed a minimum charge on shipments of less than a carload of freight.

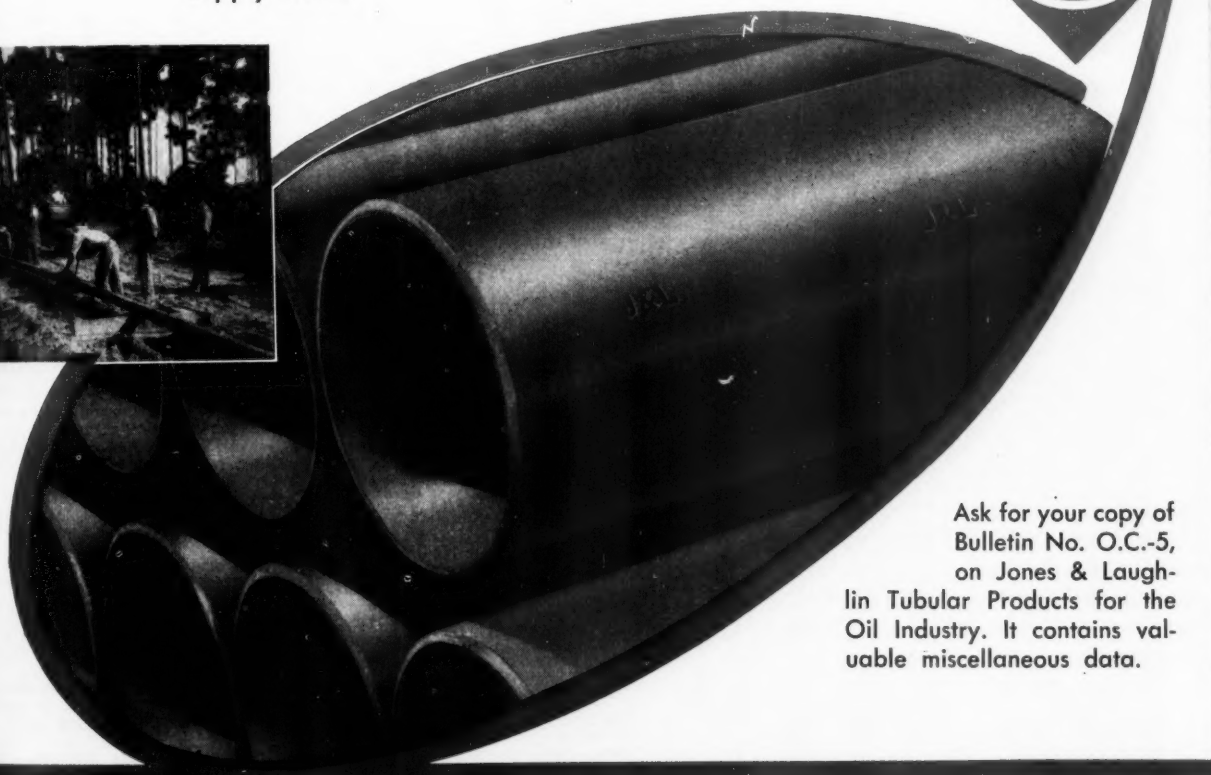
Of *First Importance* in planning any pipe line

Too many people think that "pipe is pipe." No pipe should be laid without first investigating the differences that do actually exist.

An early step of first importance in planning any pipe line is to consider the improvements achieved by J&L engineers and metallurgists.

Men qualified to consult with you are immediately available through your Jones & Laughlin Supply store.

J&L PIPE



Ask for your copy of Bulletin No. O.C.-5, on Jones & Laughlin Tubular Products for the Oil Industry. It contains valuable miscellaneous data.

JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary of Jones & Laughlin Steel Corporation

TULSA, OKLAHOMA

"... here's MY warehouse!"

J&L STEEL

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 23, 1946

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	27	14	0	*13	37,537	1,422	1,327	0	0	0	0	0	0	0	0	0	0
Pennsylvania	73	39	8	†26	114,973	3,575	3,650	0	0	0	0	0	0	0	0	0	0
West Virginia	17	3	11	3	44,786	678	727	0	0	0	0	0	0	0	0	0	0
Ohio	26	2	8	16	67,737	1,141	894	0	0	0	2	2	3	0	13	38	54
Indiana	12	8	0	4	25,303	337	177	0	0	0	2	2	4	0	0	18	22
Kentucky	6	2	2	2	9,277	420	513	0	0	0	0	0	7	0	0	35	42
Illinois	46	24	0	22	116,293	2,085	1,635	0	0	0	12	12	52	0	1	417	470
Michigan	22	5	7	10	48,420	731	681	0	0	0	6	6	20	0	8	235	263
Kansas	39	10	10	19	127,860	1,794	1,572	0	0	0	13	13	27	0	2	242	271
Neb., Mo., Iowa	1	0	0	1	3,646	19	28	0	0	0	1	1	0	0	0	14	14
Oklahoma	82	39	6	‡37	222,591	2,694	2,159	2	0	0	15	17	86	0	36	347	469
Texas	150	94	8	48	682,693	7,045	6,353	4	0	0	21	25	196	26	32	1,168	1,422
North Central	53	31	0	22	150,171	2,479	1,960	4	0	0	9	13	70	0	4	478	552
West	35	25	1	9	185,821	1,575	1,583	0	0	0	4	4	46	0	1	158	205
Panhandle	4	2	0	2	11,025	284	495	0	0	0	0	0	0	0	0	5	5
Eastern	9	4	3	2	60,640	632	339	0	0	0	0	0	44	22	13	231	310
Gulf Coast	37	25	3	9	231,824	1,551	1,507	0	0	0	6	6	17	2	5	97	121
Southwest	12	7	1	4	43,212	524	469	0	0	0	2	2	19	2	9	199	229
Louisiana	31	14	3	14	171,458	1,259	982	0	0	0	6	6	45	13	7	170	235
Northern	20	9	3	8	69,011	718	422	0	0	0	3	3	9	0	2	93	104
Southern	11	5	0	6	102,447	541	560	0	0	0	3	3	36	13	5	77	131
Arkansas	1	0	0	1	4,014	161	160	0	0	0	1	1	7	0	0	35	42
Mississippi	2	1	1	0	19,955	223	333	0	0	0	0	0	1	0	1	61	63
Southeastern States	1	0	0	1	5,655	39	54	0	0	0	1	1	1	0	0	32	33
Montana	11	5	3	3	29,053	292	292	0	0	0	1	1	10	0	4	29	43
Wyoming	6	5	0	1	23,265	154	205	1	0	0	1	2	12	0	3	34	49
Colorado-Utah	3	3	0	0	19,334	144	51	0	0	0	0	0	4	0	0	16	20
New Mexico	3	2	0	1	13,972	358	377	0	0	0	1	1	4	0	0	36	40
California	18	13	0	5	93,538	1,354	2,030	0	0	0	0	0	27	0	5	199	231
Total United States	577	283	67	227	1,881,360	25,925	24,200	7	0	0	83	90	506	39	112	3,126	3,783
Total previous week	630	331	94	205	2,067,069	25,348	23,759	6	0	5	75	86	499	39	112	3,043	3,693
Total Nov. 24, 1945	531	245	63	223	1,803,027			7	1	6	86	100	473	22	124	3,115	3,734

Service wells included: *13, †25, ‡1.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.17	....	....	....
19-19.9	1.21	....	....	....
20-20.9	1.24	$1.30	....	$1.17
21-21.9	1.28	1.32	....	1.19
22-22.9	1.32	1.34	....	1.21
23-23.9	1.35	1.36	....	1.23
24-24.9	1.39	1.38	$1.61	1.25
25-25.9	1.43	1.40	1.63	1.27
26-26.9	1.46	1.42	1.65	1.29
27-27.9	1.50	1.44	1.67	1.31
28-28.9	1.54	1.46	1.69	1.33
29-29.9	1.57	1.48	1.71	1.35
30-30.9	1.61	1.50	1.73	1.37
31-31.9	....	1.52	1.75	1.39
32-32.9	....	1.54	1.77	1.41
33-33.9	....	1.56	1.79	1.43
34-34.9	....	1.58	1.81	1.45
35-35.9	....	1.60	1.83	1.47
36-36.9	....	1.62	1.85	1.49
37-37.9	....	1.64	1.87	1.51
38-38.9	....	1.66	1.89	1.53
39-39.9	....	1.68	1.91	1.55
40 and above	....	1.70	1.93	1.57

*For crude from Daboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

(Quotations shown here are f.o.b plant in tank cars and in cents per gal. as of last Monday.

REFINERY GASOLINE

Octane (A.S.T.M.) 78-78½†	73-75
Mid-Continent*	7.375-7.625 6.625-7.000
Tex. Gulf Coast	7.250 6.500-6.750
New York Harbor	11.9 10.4
California	6.250-6.750

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	5.000	6.000
N. Texas (f.o.b. plant)	4.250	5.100
N. Louisiana (f.o.b. plant)	4.500	5.400
California (averages)	5.500	6.250

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.70
Kettleman Hills, California*	1.69
Beauregard Parish	1.65
Illinois Basin	1.82
Pecos County, Texas (Yates)	1.40
Bradford, Pennsylvania	3.41
Eastern Ill., and Western Ind.	1.67

Note: Crude prices exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended November 16, 1946

(Figures in thousands of barrels)

	Daily crude runs to stills	Stocks Gasoline	Distillate	Residual
East Coast	736	19,219	24,923	11,902
Appalachian	149	3,311	743	651
Ill., Ind., Ky.	783	15,509	8,682	5,603
Okla., Kan., Mo.	379	8,602	3,578	1,336
Inland Texas	216	3,144	598	828
Tex. Gulf Cst.	1,136	14,409	10,996	7,716
La. Gulf Cst.	352	4,325	4,074	2,418
N. La., Ark.	65	1,619	539	220
Rocky Mtn.	132	1,581	578	686
California	768	16,501	12,510	29,192
Total 11-16-46	4,716	88,220	67,221	60,552
Total 11- 9-46	4,714	86,963	67,286	61,340
Total 11-17-45	4,603	81,668	46,142	45,589

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended	Bbl. of crude*
November 16, 1946	221,670,000
November 9, 1946	221,302,000
November 17, 1945	220,503,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Nov. 23 crude oil	B. of M. Nov. demand	Nov. 16 crude oil
Alabama	1,000	1,200	1,100
Arkansas	78,900	77,000	78,500
California	872,800	850,000	871,000
Colorado	38,070	32,000	37,020
Eastern	68,500	64,200	64,800
Florida	.....	200	.....
Illinois	202,200	212,000	204,000
Indiana	18,800	19,000	19,350
Kansas	280,700	263,000	269,900
Kentucky	30,050	29,000	29,950
Louisiana	407,700	382,000	407,000
North Louisiana	98,350	.....	97,650
South Louisiana	309,350	.....	309,350
Michigan	48,200	46,000	44,515
Mississippi	79,000	60,000	78,350
Montana	23,490	24,000	23,770
Nebraska	750	800	750
New Mexico	100,500	99,000	100,500
Oklahoma	366,900	383,000	365,200
Texas	2,096,750	2,090,000	2,096,750
District 1 (Southwest)	19,000	.....	19,000
District 2 (Southwest)	147,200	.....	147,200
District 4 (Southwest)	226,300	.....	226,300
District 3 (Gulf Coast)	464,300	.....	464,300
District 5 (Eastern)	36,850	.....	36,850
District 6 (Eastern)	105,100	.....	105,100
East Texas field	324,000	.....	324,000
District 7C (West)	29,500	.....	29,500
District 8 (West)	507,250	.....	507,250
District 7B (W. Central)	35,300	.....	35,300
District 9 (N. Central)	121,400	.....	121,400
District 10 (Panhandle)	80,550	.....	80,550
Wyoming	102,210	97,000	103,100
Miscellaneous other	.....	600	.....
Total United States	*4,816,520	4,730,000	4,795,555
Change from prev. week, up	20,965		

Total production January 1-November 23 ..... †1,554,107,279 bbl.
Same period last year (crude, plus condensate) 1,534,077,925 bbl.
*Not incl. 23,350 bbl. condensate. †Incl. 7,857,800 bbl. condensate.

CRUDE-OIL STOCKS 221,670,000 bbl. as of November 16—up 368,000 bbl. One year ago 220,503,000 bbl.

GASOLINE STOCKS 88,220,000 bbl. as of November 16—up 1,257,000 bbl. One year ago 81,668,000 bbl.

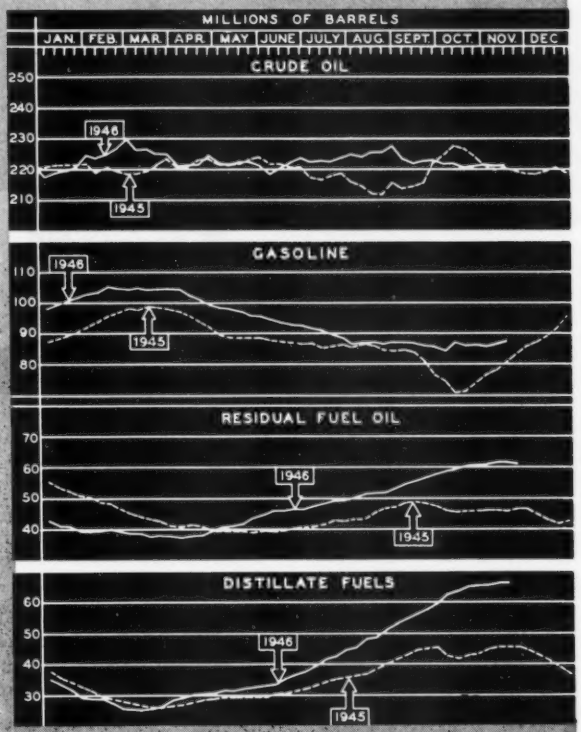
RESIDUAL FUEL-OIL STOCKS 60,552,000 bbl. as of November 16—down 788,000 bbl. One year ago 45,599,000 bbl.

GAS OIL AND DISTILLATE STOCKS 67,221,000 bbl. as of November 16—down 65,000 bbl. One year ago 46,142,000 bbl.

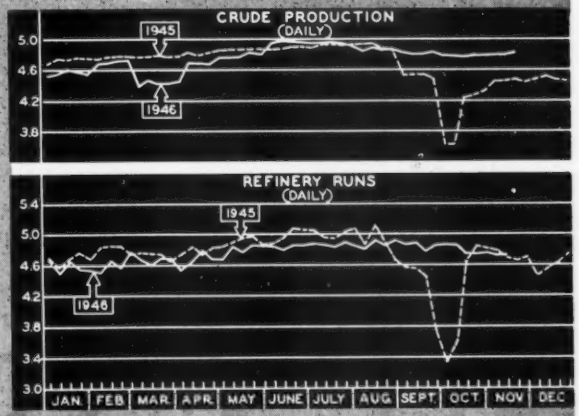
CRUDE-OIL PRODUCTION 4,816,520 bbl. as of November 23—up 20,965 bbl. One year ago 4,470,500 bbl.

REFINERY RUNS 4,716,000 bbl. daily week ended November 16—up 2,000 bbl. One year ago 4,603,000 bbl.

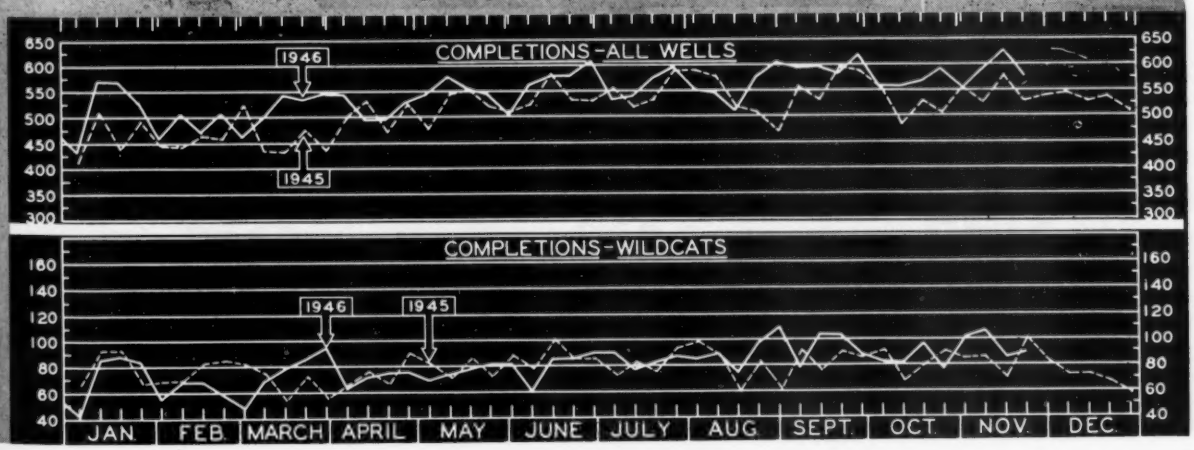
OIL STOCKS IN THE UNITED STATES



DAILY OPERATIONS



Solid line charts weekly completions, service wells in Eastern area included.



FOR RENT
72-miles DRILL PIPE
Size 2⅜", 2⅞", or 3½" internal flush drill pipe for rent. All first quality. Thoroughly inspected internally and externally. Ready for immediate delivery ... and perfect performance on the job.
DRILLING TOOLS
All modern and in perfect operating condition, our Rental Equipment includes the following:
• AMERICAN DRILL COLLARS: 3⅝" O.D. to 6¼"
• CAMERON BLOWOUT PREVENTERS: 10,000 lb. and 6,000 lb. test Q. R. C., 7" and 10¾"
• AMERICAN KELLYS: Sizes 3", 3½", and 4¼"
• ROTARY TONGS: new style—Sizes 2⅜" to 5¾"
• ROTARY SLIPS: Sizes 2⅜" and 3½"
• ELEVATORS: Sizes 2⅜", 2⅞", and 3½"
• HUGHES TYPE "J" CORE BARRELS
• SAFETY JOINTS: 2⅞", 3½" and 4½"
• ROTARY SUBS: Sizes 2⅜" to 4½"
Only NEW Pipe, Tool Joints and Equipment are added to our RENTAL STOCKS!
GRAY RENTAL DIVISION
A AMERICAN IRON & MACHINE WORKS CO. OKLAHOMA CITY, OKLAHOMA
Office & Yard: 1801 Semmes—Capitol 9596—Charter 4-5648—Houston 10, Texas
Night Phones: C. L. Braswell—Woodcrest 6-5094 — C. D. Fitch—Madison 2-6389
ELEVATORS
SAFETY JOINTS
AMERICAN KELLYS
ROTARY SLIPS
ROTARY TONGS
Branches: Alice and Odessa, Texas—Shreveport and Harvey, Louisiana

Exploration and Drilling

Exploration Economics

EXPLORATION for oil, like any phase of any other business, is a complex affair, in which there are always several ways of going about making a play in any specific area. The choice of the method to use, other things looking about equal, must be on a basis of dollars-and-cents cost.

As a result of this, the older geologists who are watching the Cotton County play in southern Oklahoma, are having some quiet chuckles at the bewilderment of some of the younger geologists and geophysicists. with a red-hot leasing play, wildcats being drilled all over the countryside, and field wells drilled in 3 days on close spacing to producing sands at 1,300-1,600 ft., it is a tough job to keep even a development map spotted up to date.

Ordinary well logs are available only far behind actual development, very few electric logs have been made, and still fewer cores taken. There are no good geological markers for the drillers to pick up in the section above the pay sand. Subsurface maps are few, extremely difficult to keep up to date, and the data available for them are often questionable. All this makes it very puzzling to younger men, whose entire experience has been since the days of deep drilling, wide spacing, electric logging, coring, drill-stem testing, geophysical data, and careful integration of all available data.

The older geologists are reminded of how they had to do things in their younger days. However, they have the advantage of understanding why it is not worth while to attempt to gather so much of the data customary in deeper plays.

Everyone interested is familiar with the regional geology, a high or perhaps a series of highs paralleling the Wichita Mountains. A lot of dry holes have been drilled along the high spots on this regional high, by major companies who combed the region in past years. It is known that the Pennsylvanian section thins out over the top of the regional high and that wells go into the Arbuckle lime at shallow depths directly from the Pennsylvanian.

On the flanks of the regional high, more of the Pennsylvanian section is present, and at some spots sedimentary conditions were favorable to the development of good sand deposits. Oil has accumulated in these sands in some places. The available evidence indicates that it is doubtful if local structure had anything particular to do with the oil accumulation. To date there is not enough information availiable to draw any commercially worth-while conclusions about the "what and why" of the sedimentary environment.

The exploration economics of such a situation dictate that the cheapest way to explore for oil is to estimate trends of sand conditions in a broad sense as quickly as possible, then drill a lot of cheap wildcats around spots that look promising. The wells can be drilled quickly and many prospects in a substantial area tested rather thoroughly in a short time for a reasonable amount of money.

After all, it is oil that is being sought, and here the cheapest way to get the answer is to drill several wildcats and drill them quickly. Because it is cheap drilling, the little operator can and does move in just as fast as the big company. The pace is fast and the competition stiff. If these were 10,000-ft. wells instead of 1,500-ft., the play would be made along lines to which the younger men are more accustomed.

MISSISSIPPI

Superior's Deep Test Drilling Below 16,000 Ft.

JACKSON.—Superior Oil Co.'s deep test in Forrest County, which last week was rumored to be drilling below 16,000 ft. and heading for the record in total depth, was reliably reported at 15,725 ft. Whether or not the well would be carried deeper was not determined. However, operators reran casing and were testing oil shows found around 13,000 ft. Total depth is well below the previous record depth for the state, held by The California Co. at its 1 Smith in the Brookhaven area of Lincoln County, which went to 12,843 ft. in the Glen Rose, but is short of the 16,665-ft. dry hole drilled by Phillips Petroleum Co. in Austin County, Texas.

In Issaquena County, C. H. Osmond's 1 Tully, Section 9-17n-3e, had total depth at 7,042 ft. in sand. A drill-stem test at 6,579 ft. recovered salt water and some gas.

ALABAMA

In the East Gilberton field, Choctaw County, Carter Oil Co. 2 Allman had total depth at 3,290 ft. Shots at 2,280-95 ft. resulted in swabbing salt water with some oil, then pure salt water. These perforations were squeezed and new shots made at 3,275-80 ft. It swabbed down to 2,500 ft. and was recovering 10 bbl. of oil an hour. On last report, operators had pulled tubing and perforated the casing at 3,190-3,280 ft., reran tubing to 3,148 ft. and were again ready to swab down for further tests.

FLORIDA WILDCAT FAILURE

Gulf County: Pure Oil Co. 1 Pick-Hallinger, NW SE SE NE 12-9s-11w, dry, TD 5,655 ft., no tops reported.

N. CENRAL TEXAS

Noodle Field Gets Large Completion

WICHITA FALLS. — Wilbargers County's new oil find, National Associated Petroleum Co. and The Texas Co. 1 Crouch, Section 24, H&TC Survey, 2 miles north of Tolbert in the western part of the county, perforated casing at 5,023-83 ft. in the Palo Pinto lime and bailed 20 bbl. of oil and 5 bbl. of water in 11 hours. Previous drill-stem tests indicated oil at 5,064-74 ft., 5,065-95 ft., and 5,112-26 ft., with the latter test the only one showing water.

In Young County, 4½ miles southeast of Olney, L. T. Burns 1 Ellis made completion tests flowing 100 bbl. of 44°-gravity oil in 5 hours through ⅛-in. choke from pay at 4,849-65 ft. It opens a new field.

In Montague County, Eason Oil Co. 1 Temple Yarbrough Trust, new discovery 4 miles north of St. Jo, drilled on down from 4,104 ft. to 4,122 ft. had a hole full of oil, all tankage filled, and was waiting for clearance to run the oil before resuming production tests. Since casing the well and drilling the additional 18 ft., no water has been encountered.

Seven miles southeast of Henrietta, in Clay County, Jack Grace 1 Bryant Edwards "C" flowed an average of 75 bbl. of oil an hour from conglomerate at 6,075-88 ft., apparently in the base of the Pennsylvanian or top of the Mississippian. The well started to flow when casing plug was drilled at 6,072 ft. The same operator's 1 Edwards "B," now making a small flow from the Caddo around 5,900 ft., will be deepened.

The Noodle field of Jones County received an unusually large completion last week at Humble Oil & Refining Co. 8 Mrs. Rozilla Graves, Section 41, T&P Survey, which was finaled for a daily rate of 2,006 bbl. of 45°-gravity oil. Flow was through ⅜-in. choke on tubing with a pressure of 210 lb. The Reef lime pay was topped at 2,861 ft.

NORTH CENTRAL TEXAS SUCCESSFUL WILDCATS

Throckmorton County: Fred Manning 1

Increase RESERVES AND PROFITS BY *Secondary Recovery*

EXPERIENCED PRACTICAL CONSULTING REPRESSURING AND WATER FLOODING PRODUCTION ENGINEERING SERVICE

- Preliminary Surveys
- Gas Measurements
- Bottom Hole Pressure
- Compressor Plants
- Installation
- Water Treating Plants
- Core Analysis
- Estimate of Results
- Valuations
- Supervision

PETROLEUM ENGINEERS
CABLE & STINE
WICHITA FALLS, TEXAS

YOUR ANSWER TO MATERIAL SHORTAGES

SEE PAGE 30

M. K. Graham estate, Sec. 985, TE&L Sur., 5 mi. N of Woodson, elevation 1,265 ft., IP flowed 142 bbl. 44°-gravity oil through 12/64-in. choke, Caddo 3,837-42 ft., TD 4,617 ft., casing pressure 1,050 lb., tubing pressure 640 lb., gas-oil ratio 836:1.

Young County: L. T. Burns 1 C. Ellis, Sec. 207, TE&L Sur., 4½ mi. SE of Olney, elevation 1,158 ft., IP flowed 100.36 bbl. 44°-gravity oil in 5 hours through ⅛-in. choke, lime pay 4,849-65 ft., casing pressure 1,100 lb. tubing pressure 1,020 lb., gas-oil ratio 750:1, TD 4,865 ft.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Harvey Drilling Co. 1 C. L. Abercrombie "H," 8 mi. W of Archer City, J. W. Harris Subd. of Club Ranch, elevation 1,090 ft., dry, TD 1,535 ft., Gunsight 1,499 ft., slight show oil in sand 1,528 ft.

Reno Oil Co. 1 Jentch, Blk. 115, ATNCL Sur., 6 mi. NW of Archer City, dry, TD 1,220 ft. in shale.

Staley Oil Co. 3 V. Powell, J. M. Armstrong Sur., 4½ mi. SE of Archer City, dry, TD 968 ft. in shale.

Wichita County: Frank Wood 1 J. Siber, Blk. 51, Red River Valley Land Sur., 5 mi. W of Burkburnett, elevation 1,086 ft., dry, TD 2,856 ft., faint oil show in soft lime 2,846-50 ft.

Wilbarger County: Frank Wood 1 Dave Melton, Sec. 15, H&TC Sur., 10 mi. SE of Harrold, dry, TD 2,510 ft. in shale.

Young County: Henry Craig et al 1 Gilbert, Sec. 221, TE&L Sur., 1 mi. S of Olney, dry, TD 983 ft.

Henry Craig 1 E. F. Meredith, Sec. 212, TE&L Sur., 3 mi. SE of Olney, dry, TD 847 ft. in shale and sand, show oil in broken sand 829 ft.

WEST CENTRAL TEXAS SUCCESSFUL WILDCATS

Runnels County: W. R. Ransome 1-A John W. Harris, Blk. 1, J. V. Cabrera Sur. 514, ½ mi. W of Crews, elevation 1,921 ft., flowed 59 bbl. 42-gravity oil, pay sand 3,900-30 ft., TD 4,085 ft.

Shackelford County: Roeser & Pendleton, Inc. 1-B-90 W. I. Cook estate, Sec. 90, ETRR Sur., 8 mi. NW Albany, elevation 1,869 ft., pumped 90 bbl. 38-gravity oil, pay sand 1,315-28 ft., TD 1,328 ft.

WEST CENTRAL TEXAS WIDCAT FAILURES

Callahan County: Carl Hovgard and George Waite 1 Young, Sec. 6, SPRR Sur., 5½ mi. NW of Clyde, elevation 1,899 ft., dry, TD 1,947 ft. in shale.

Stephens County: North American Oil et al 1 Couger, J. Poitevent Sur. 2, 6 mi. E Ivan, elevation 1,714 ft., dry, TD 4,141 ft. in black shale, Caddo 3,362 ft., Marble Falls 3,890 ft., sand with slight show of oil and gas 3,960-4,000 ft.

EASTERN TEXAS

Gas Production in Prospect For Cherokee County

DALLAS.—Gas production in Cherokee County, that may reveal a southwest trend from Waskom and Carthage, was in prospect last week at Standard Oil Co. of Texas 1 New Birmingham, a deep test 2 miles northwest of Maydell. A test of the James lime of the lower Rodessa section at 9,096-9,136 ft. blew air for 25 minutes and recovered a 2,800-ft. water cushion but no gas showed at the surface. In 30 minutes the surface pressure was only 2 lb., but when one stand of drill pipe was pulled, the well unloaded 2,580 ft. of water cushion, followed by a strong gas blow for 1 hour, then 220 ft. of water, or the balance of the cushion, plus 1,200 ft. of gas-cut mud. Bottom-hole pressure then was 1,550 lb. Operators planned to core the section to determine its extent and then will test the Pettit zone. Elevation is 478 ft., and top of the James was 9,094 ft.

The Norman Paul field of Wood County, opened recently by Bobby Manziel for production in the Woodbine around 5,400 ft., was in line for sub-Clarksville pay at the second well in the field. Sun Oil Co. 1 Clanton, Davy Survey, and southwest of the discovery, picked up a good show of 29°-gravity oil at 4,798-4,815 ft. A drill-stem test at that level recovered 180 ft. of dark-brown oil and 60 ft. of gas-cut mud in 30 minutes. A strong blow was evident throughout the test and bottom-hole pressure was 150 lb. through ¼-in. chokes. The well apparently hit a fault in the Austin as that section was out, as was the Eagleford. Top of the sub-Clarksville was 4,793 ft.

An application to the Texas Railroad Commission was made last week, requesting that the sub-Clarksville horizon in the Manziel field be recognized as a separate field and prorated as such. It was also asked that the field be known as the Manziel (sub-Clarksville) field.

Last reports on Wood County's deep tests included: Humble Oil & Refining Co. 1 McKnight, Hawkins field exploration test, drilling below 9,823 ft. in sandy shale; Amerada Petroleum Co. 2 Coke, in the Coke field, preparing to set up heavier rig at total depth of 8,771 ft.; and Shell Oil Co., Inc., 12 Goldsmith, in the Quitman field, shut down for repairs at 7,040 ft., total depth.

LA.-ARK.

New Distillate Production In Waskom Gas Area

SHREVEPORT. — New distillate production found recently on the east and west flanks of the Waskom gas area extending from East Texas into North Louisiana has spurred drilling on both sides of the state line. Last week Arkansas-Louisiana Gas Co. made application to drill on the Louisiana side in Caddo Parish. The test will be the 1 D. W. Bell, in Section 6-17n-16w. G. H. Neighbors has contract and will drill to the Pettit zone.

In DeSoto Parish, F. A. Callery et al 1 B. C. Strauss was drilling ahead below 4,664 ft. in shale, after testing shows found in the Paluxy sand topped at 4,066 ft. A drill-stem test at 4,068-89 ft., open 10 minutes, returned a fair blow with little pressure, and recovered 1,800 ft. of fluid. The top 300 ft. was cut with oil and slightly salty, but operators believed the salt was from leaky packers.

In Catahoula Parish, Penrod Drilling Co. 1 J. P. Mitchell, Section 36-8n-7e, will squeeze perforations at 9,337-46 ft. after swabbing to 4,500 ft. and recovering only salt water with a show of oil. Total depth is 9,471 ft. in the Lower Cretaceous.

Carter Oil Co. 1 E. L. Holloway, Section 17-14s-21w, Nevada County, Arkansas, was drilling below 1,302 ft., after finding some oil shows in shallow sands at 1,215-23 ft. and 1,223-31 ft. Elevation is 345 ft. Atlas Oil Refining Co. 1 Wynne, Section 8-16s-19w, Columbia County, was waiting on pump after swabbing down to 2,900 ft., recovering 40 per cent oil. Total depth is 6,627 ft. in the Smackover but pay zone is around 3,500-12 ft.

ARKANSAS WILDCAT FAILURE

Ouachita County: Atlas Oil & Refining Co. 1 Green, C SE SW 4-14s-19w, dry, TD 4,014 ft., Nacatoch 1,308 ft., chalk 1,849 ft., Blossom 2,060 ft., Tokio 2,212 ft., Lower Cretaceous 2,315 ft., James 2,350 ft., Travis Peak 2,605 ft., Cotton Valley 3,375 ft.

NORTH LOUISIANA WILDCAT FAILURES

Franklin Parish: Atlas Oil & Refining Co.

1 Cox et al, SE NW NE NW 9-15n-9e, dry, TD 5,352 ft., Cook Mountain 806 ft., Sparta 935 ft., Wilcox 2,023 ft., Midway 3,497 ft., chalk 3,955 ft., Gas Rock 3,967 ft., Austin 3,983 ft., Tuscaloosa 4,348 ft., Massive sand 5,172 ft., Lower Cretaceous 5,218 ft.

Madison Parish: Atlas Oil Corp. 1 Yerger, NE SE SE SE 50-16n-14e, dry, TD 8,010 ft., Wilcox 2,950 ft., Midway 5,313 ft., Clayton 5,906 ft., Gas Rock 5,932 ft., Austin 5,968 ft., Eagleford 6,445 ft., Tuscaloosa 6,990 ft., Massive sand 7,803 ft.

Ouachita Parish: Crescent Drilling Co. 1 Feazell-Caldwell, SE NW 18-18n-3e, dry, TD 3,392 ft., Wilcox 1,174 ft., Midway 1,697 ft., Gas Rock 2,328 ft., Tuscaloosa 2,712 ft., anhydrite 3,368 ft.

PERMIAN BASIN

Coke County Wildcat Has Prospects of Oil

MIDLAND.—In northwest Coke County, some 23 miles northwest of the town of Robert Lee, and 1 mile southeast of Old Silver, Sun Oil Co.'s wildcat, 1 Jameson, had prospects of oil in Strawn limestone of Pennsylvanian age topped at 6,200 ft., on an elevation of 2,080 ft. Traces of porosity, oil stain, and fluorescence were found at 6,200-10 ft. A core at 6,210-30 ft. recovered 5 ft. of lime, with the last 3 ft. being very porous and saturated with oil. A 45-minute drill-stem test at 6,206-30 ft. brought gas to the surface in 29 minutes. Flowing pressure was 150 lb. and it was estimated good for 2,000,000 cu. ft. of gas a day. Oil recovery amounted to 500 ft., testing 47°-gravity at 78° F., which was estimated to correct to 44° gravity. Operators were running casing for production tests on last report.

Midland County's deep test 2 miles south of the Midland field, at Humble Oil & Refining Co. 1 Mary E. Turner, took a drill-stem test at 11,350-94 ft. The tool plugged up with drill cuttings at the end of 38 minutes, during which time it had a faint blow of air at the surface. Recovery was 210 ft. of gas-cut mud. Operators resumed drilling and on last report were below 11,396 ft. in Devonian lime.

In Andrews County, 5 miles southeast of Shafter Lake, Union Oil Co. of California 1-F Mrs. A. C. Means, had plugged back to 4,690 ft. in the San Andres and was cleaning out with some 600 ft. of oil in the hole. The well made a 6-minute flow of oil after a nitroglycerin shot at 4,615-90 ft. but the hole bridged at 3,500 ft. with gravel and shells which lodged in the casing. This bridge was originally reported at 3,170 ft. There was no water found with the oil.

Schleicher County's wildcat was disappointing last week after an acid treatment of 3,000 gal. in the upper of three Permian zones showed the section dry. The Page field outpost, L. W. Eliott 1 Virgil Tisdale, located 3½ miles east of Eldorado, acidized through perforations at 2,654-92 ft., drilled out to 2,774 ft. and cleaned out. Perforations were next made at 2,710-71 ft. with 224 shots, covering two zones, 2,709-26 ft. and 2,744-70 ft., from which oil-cut mud was recovered on drill-stem tests last week. The latter treatment, consisting of mud and regular acid, brought no results.

WEST TEXAS WILDCAT FAILURES

Andrews County: Marr & Vaughn 1-7 Lotus Oil Co., Sec. 7, Blk. A-47, PSL Sur., 2½ mi. SW of Fullerton, dry at 216 ft. Marr & Vaughn 1-27 Lotus Oil Co., Sec. 27, A-48, PSL Sur., 2½ mi. SW of Fullerton, dry at 227 ft.

Fisher County: Harley Sadler 1 Ubben, Blk. R, W. R. Richardson Sur., 3 mi. E of Royston, elevation 1,857 ft., dry at 3,208 ft. TD, acidized with 1,000 gal., pumped 123 bbl. water and 4 bbl. oil in 14 hours, Sedwick 2,660 ft., Camp Colorado 2,932 ft., Saddle Creek 3,149 ft.

Scurry County: Seaboard Oil Co. 1 J. R. Randals, Sec. 257, Blk. 97, H&TC Sur., 9 mi. NW of Snyder, elevation 2,492 ft., dry, TD 3,310 ft. in lime, San Andres 1,830 ft., Glorietta 2,650 ft., Clear Fork 2,750 ft.

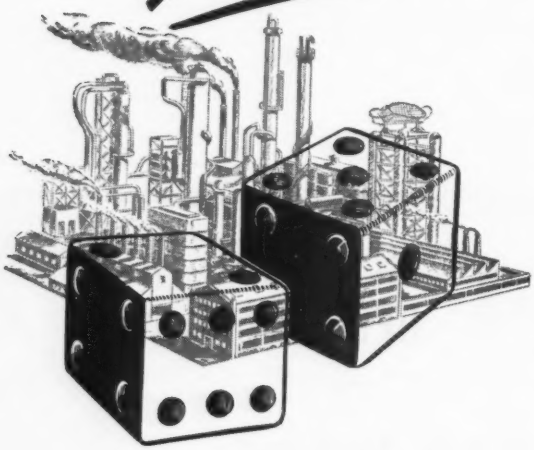
SOUTHEASTERN NEW MEXICO

HOBBS.—Production from the Basal Permian, or upper Devonian, was in prospect for the Hobbs field of Lea County, where production is from the San Andres zone of the Permian, at Sun Oil Co. 1-B McKinley. Located on the north side of the field, in 20-18s-38e, this well was deepened from 4,242 ft. to 7,658 ft. A drill-stem test at 7,610-58 ft. recovered 210 ft. of sweet oil and 30 ft. of drilling mud in 3 hours. There was no water. Gas rose to the surface in 90 minutes but flowing pressure was not gaged. Shutin pressure was 500 lb. Operators will make further tests after setting casing and treating with acid, but were of the opinion that only a small producer would be developed. The oil tested 38° gravity at 72° F. Elevation of the test is 3,657 ft.

Included in the 12 first reports last week, 5 in Eddy County and 7 in Lea, was M. W. Jones 1 Jones-State, SE SE SW 12-19s-27e, a wildcat that will go to 2,000 ft. to test the area midway between the McMillan and Artesia fields of Eddy County. Drilling is already under way. Another wildcat starting is T. G. Shappell 1 Bradley, NW NW NW 13-24s-26e, located 1 mile north and slightly east of the discovery well of the Black River area, and 1 mile west of Yates 1 Conlon, a 2,370-ft. dry hole.

AS A VALVE SHUTS OFF STEAM . . .
EAGLE LEAD WOOL
shuts off bottom water!
When bottom water threatens to sabotage your wells, you can stop it pronto with Eagle Lead Wool. This finely stranded, metallic wool makes a solid, lasting, watertight seal when tamped into cracks and crevices around the bottom of the hole. Economical Eagle Lead Wool saves you time, oil, money. It's easy to install—comes packed in convenient, 50-pound sacks—is easy to place in special cartridge-shaped Eagle Wire Containers sized to fit all casings. Order through your jobber today!
EAGLE EP PICHER
EAGLE LEAD WOOL
Seals off bottom water —keeps 'em flowing!
These 3 Eagle Bearing Metals meet most requirements . . .
Eagle Dreadnaught—for extreme speed and pressure conditions.
Eagle Outlasta—for medium speed and pressure conditions.
Eagle Durable—for low speed and pressure conditions.
THE EAGLE-PICHER COMPANY
Chicago • Joplin • Cincinnati • Dallas • Kansas City

DRIOCEL IS A "Natural"



for a *TOUGH* TASKMASTER

Industry today expects more from the desiccants it buys. It requires that they dry a greater variety of gases and liquids to more rigid specifications. Efficiency and economy, too, are increasingly important. This calls for a versatile adsorbent, and Driocel has unique features that make it a "natural" for many difficult as well as routine drying jobs.

One important characteristic of Driocel is its low iron content . . . *held to 3% or under*. This means not only a longer adsorbent life, but it means also that higher Dry Gas Capacity values are maintained through repeated regenerations. Drying operations can be conducted in such a manner that low-iron Driocel is unaffected by appreciable quantities of hydrogen sulfide. In fact, Driocel is even used in the drying of H_2S with satisfactory results.

This activated bauxite desiccant is successfully drying hydro-carbon gases and liquids, liquid organic chemicals, electrical oils, hydrogen and compressed air. These installations involve wide pressure, temperature, and moisture ranges. In most cases, Driocel meets these conditions with superior performance and long life. And, the fact that Driocel's price is substantially lower than other well known solid desiccants is noteworthy.

Perhaps your drying problems can be solved, or your processing improved by using Driocel. Why not consult us? Our work with bauxite desiccants has been extensive and we would be glad to assist. Address: Attapulgus Clay Company (Exclusive Sales Agent), Dept. G, 260 South Broad Street, Philadelphia 1, Pa.

POROCEL

ACTIVATED BAUXITES • SUPPORTED CATALYSTS • CATALYST CARRIERS • ADSORBENTS AND DESICCANTS

SLICK CHICK . . .

No jack-of-all-trades, the hen. She specializes. Eggs and eggs alone are her business, and in her business she's a terrific perfectionist.

SPROCKET CHAINS ***and sprocket chains alone are our business.***

We, too, are specialists. No side lines—just sprocket chains. In particular we concentrate on Oil Field Chains for every application. Call in Union Chain and let *specialists* work on your power transmission problems.

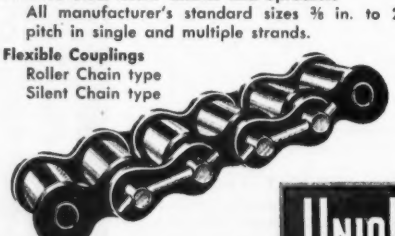
THE UNION CHAIN AND MANUFACTURING CO.
SANDUSKY, OHIO, U.S.A.
Chain Specialists Since 1913

Union Oil Field Chain for Every Application

A.P.I. No. 3½ P Union **Superintendent** No. 3125-R
A.P.I. No. 3½ P Union **Superintendent** No. D-3125-R
A.P.I. No. 4 P Union **Jumbo** No. 1240-SXX
A.P.I. No. 4 P Union **Toolpusher** No. 1240-RXX
A.P.I. No. 4 P Union **Driller** No. 1240-R4
A.P.I. No. 4 C Union **Roughneck** No. 1240-RX
A.P.I. No. 3 P Union **Toolpusher** No. 1190-RXX
A.P.I. No. 3 P Union **Driller** No. 1190-R3
A.P.I. No. 3 C Union **Roughneck** No. 1190-RXS

Finished Steel Roller Chains and Sprockets
All manufacturer's standard sizes ⅜ in. to 2½ in. pitch in single and multiple strands.

Flexible Couplings
Roller Chain type
Silent Chain type



Oil Field Chain Export Sales
E. F. GAHAN
500 Fifth Ave., New York 18, N. Y.

UNION CHAINS

SOUTHEASTERN NEW MEXICO WILDCAT FAILURE

Chaves County: Magnolia Petroleum Co. 1 Black Hills Unit, NW NE 31-17s-20e, 25 mi. W of Artesia, elevation 4,905 ft., dry, TD 6,085 ft., no shows, Glorietta 830 ft., Drinkard 2,360 ft., Pennsylvanian 4,380 ft., Mississippian 4,935 ft., Devonian 5,145 ft., shale 5,930 ft., sand 6,070 ft.

SOUTH LOUISIANA

Second Test Made on Big Island Well

NEW ORLEANS. — Union Producing Co. and M. H. Marr 1 John Tyler, ½ mile east of the 1 Belgard, Tuscaloosa discovery in the Big Island field, Rapides Parish, NE NE 14-4n-3e, made a second drill-stem test at 9,684-92 ft., and in 10 minutes, using ¼-in. chokes top and bottom, developed 170 lb. working pressure at the top, having 3,875 lb. bottom-hole flowing pressure. Tool was pulled and recovered eight stands of clean oil, with two stands of oil-cut mud. Sand with oil shows was cored from 9,692-9,703 ft. Operators are running another test in this section.

In the Bayou Mallet field of Acadia Parish, Union Sulphur Co., Inc., 1-A George R. Bradley flowed a potential gage of 113 bbl. of 37°-gravity oil daily through a 7/64-in. choke with 1,400 lb. flowing pressure on tubing, through perforations at 8,537-40 ft. Gas-oil ratio is 805 to 1. Total depth is 8,703 ft. and 5½-in. casing is cemented at 8,619 ft.

Humble Oil & Refining Co. continues to core in the 1 Alfred Ray Romaine et al, wildcat in the Kaplan area of Vermilion Parish, 25-12s-1e. This well is reported to have some favorable showings of oil but operators are coring ahead below 11,634 ft. in sand and shale. Projected depth is 12,000 ft.

In the Fresh Water Bayou area of Vermilion Parish, Union Oil Co. of California 4-C Louisiana Furs, 33-16s-12e, has pipe stuck in the hole. Drilled to a total depth of 13,941 ft., this test is credited with one good gas-condensate sand in the lower 10,000-ft. level, and three in the upper part of the 11,000-ft. level. Pipe became stuck when operators were coming out of hole to run a log.

A great deal of geophysical work is being done in Southern Louisiana. Pure Oil Co. renewed a permit for refraction seismograph work in the Gulf of Mexico; Arkansas Fuel Oil Corp. renewed its permit for gravity-meter work in Union Parish; Barnsdall Oil Co. renewed its permit for gravity-meter work in parts of Union, Ouachita, Morehouse, Richland, West Carroll parishes.

Fourteen new locations were reported this week, all in proven areas. Evangeline, Lafourche, Plaquemines, St. Mary, and Terrebonne parishes each received two new starts. Five oil wells were completed and six dry holes, three of which are wildcats, one each in Iberville, Jefferson, and Plaquemines parishes. St. Mary Parish took the lead this week with two completions while East Baton Rouge, Iberville, Jefferson, Jeff Davis, Lafourche, Plaquemines, St. James, and Terrebonne each received one completion.

SOUTH LOUISIANA WILDCAT FAILURES

Iberville Parish: T. G. Markley 1 Greif Bros. Cooperage, in Bayou Blue area, 75-9s-10e, dry, TD 7,299 ft.

Jefferson Parish: Humble 3 State-Lake Salvador, Lease 642, in Lake Salvador, dry, TD 11,656 ft.

Plaquemines Parish: The Texas Co. 17 Delta Duck Club, 7-21s-20e, 1¾ mi. south of production Delta Duck Club field, dry, TD 11,098 ft.

SOUTHWEST TEXAS

Live Oak Discovery Preparing for Completion

CORPUS CHRISTI.—Three miles south of Lucas field and ½ mile northwest of Lagarto, in Live Oak County, Roxie Wright et al 1 S. F. Beall Estate, wildcat discovery well, recovered 1,292 ft. of 46°-gravity oil on drill-stem test through perforations at 5,582-85 ft., with tool open 1½ hours. Working pressure was 48 lb., with bottom-hole pressure of 3,100 lb. flowing. Operators are now preparing to complete the well which shows shut-in pressure of 350 lb. on tubing and 1,000 lb. on casing. On previous test through perforations at 6,323-28 ft., the well tested gas, but salt water broke in on the flow, and the hole was plugged back for completion.

Henshaw Bros. and E. H. Smith 1 H. N. Schwartz et al, a new discovery about 2 miles northeast of the Lucas gas field, in Live Oak County, is reported to be flowing 30 bbl. of oil a day, with flow slowly improving. Production is through perforations at 4,017-19 ft. with 300 lb. tubing and 775 lb. casing pressure. Total depth is 4,495 ft., with 5½-in. casing set at 4,100 ft.

A new oil field for San Patricio County has been opened by Hewit & Dougherty 1 Lois Thornton, which has been completed for a flow of 40 bbl. of oil in 17 hours on initial gage through perforations at 5,442-56 ft. A 5/32-in. choke was used and the well registered 35 lb. tubing pressure. This well is located in John McMullen Survey, approximately 2 miles northwest of San Patricio townsite. On a drill-stem

MORE OPERATORS ARE DISCOVERING THE EFFICIENCY OF JP RODS AND LINERS

MACHINED Right and HARDENED HARD

Because JP Rods and Liners are made from top-quality materials, machined right and hardened hard . . . drillers are able to make more hole with fewer work stoppages. JP Rods and Liners are really standing the test and from the men in the field we get truly outstanding reports of their superior performance and satisfaction. You, too, can profit with JP—give us a try, won't you ?

Expert oil country machinists, using top-quality materials, grind and finish JP Rods and Liners to precision standards. In addition—each and every JP Rod and Liner is "hardened" by a patented process and individually inspected to approximately 600 (or better) Brinell test.

CALL — WRITE — WIRE — CABLE

Made to A. P. I. standards, JP Rods and Liners are available in all stock sizes (and special sizes) to fit any slush pump. For information on sizes and prices—ask for our New Catalog or give us your specifications.

JP

J P Machine & Tool Company

1534 S. E. 29 | P. O. BOX 4511 TEL. 3-8700 | OKLAHOMA CITY

test at 5,395-5,400 ft. it developed 350 lb. working pressure, and recovered 55 ft. of high-gravity oil; and on test at 5,441-50 ft. it recovered 285 ft. of clean oil, with 60 lb. working pressure.

A new deeper oil pay zone on the south flank of La Gloria field, Brooks County, has been opened by Argo Oil Corp. 3-A Birdie B. Riley. On potential test, it flowed 304 bbl. of oil per day through a ⅛-in. choke, with 1,825 lb. tubing and 2,075 lb. casing pressure. Gravity 43°, and gas-oil ratio was 868 to 1, with no water in the flow. Oil pay was topped at 6,961 ft., total depth is 7,406 ft., and production is through perforations at 6,970-71 ft. This well failed to produce commercially from the upper regular oil pay zones, and operators deepened to this new zone. Oil sand was also encountered at 6,927-37 ft., but showed a high gas-oil ratio.

The 5,680-ft. oil pay of Midway field, San Patricio County, has been extended 2,130 ft. southwest from the 3 Hutto, discovery well in that pay, by Boykin et al 1 C. V. Jones, which flowed 144 bbl. of oil per day through a ⅛-in. choke through perforations at 5,679-81 ft. Gravity 41°, total depth 6,068 ft. This is the third producer in this pay.

Texas Co. 37 H. C. de Tijerina, west outpost test at the Tijerina-Canales field, in Jim Wells County, has been completed in a new shallower pay zone. On initial test it flowed 54 bbl. of 42°-gravity oil through a 5/32-in. choke; gas-oil ratio was 752 to 1. Test in the regular 7,100-ft. pay recovered salt water at 7,169-79 ft. Operators now have started 38 de Tijerina, 1,193 ft. northwest of the 37 well.

Magnolia Petroleum Co. 1 O. Zimmerman, south extension gas-condensate well at La Gloria field in Brooks County, flowed on potential gage 131 bbl. of condensate and 4,045,000 cu. ft. of gas per day through 11/32-in. choke. Tubing pressure was 2,085 lb. and gas-condensate ratio 30,690 to 1. This well is 1 mile south of previous production at La Gloria field, and is in Lot 7, Block 6, Falfurrias Farm & Garden tracts.

The 29 new locations reported this week included 11 wildcats, 3 in Duval, 2 each in San Patricio and Webb, and 1 each in Jim Wells, Live Oak, McMullen, and Milam counties. There were 32 completions, 23 oil, 1 gas, and 8 dry holes. Five of the dry holes are wildcats, two in Duval, and one each in Live Oak, San Patricio, and Jim Wells counties. Duval, San Patricio, and Jim Wells counties received the greatest number of new starts while Brooks and Kleberg counties led in completions.

SOUTHWEST TEXAS WILDCAT FAILURES

Duval County: Cox & Hamon 2 Leila Peters, G. P. Garcia Survey 15, 1 mi. SE of East Peters field, dry, TD 2,806 ft.

W. Earl Rowe et al 1 Norton, in Jose Marcello Hinojosa grant, 3½ mi. SW of Realitos, dry, TD 5,210 ft.

Live Oak County: Rowan & Hope 1 E. Sinor, John Ely Survey, 8 mi. NE of George West, dry, TD 4,502 ft.

San Patricio County: W. Earl Rowe et al 1 Herbert P. Brouillette, in J. J. Welder Ranch, 3 mi. SW of Papalote, dry, TD 6,018 ft.

Jim Wells County: Haynes B. Ownby Drilling Co. 1 Lester Moore, in N. Gossett Survey 98, dry, TD 6,811 ft.

You're Assured

LONGER LIFE

from hard-to-replace refining equipment and storage tanks if you'll have them cleaned and painted regularly by STOKES. Your inquiries invited. Address:

R. A. STOKES

INCORPORATED

635 Nixon Bldg. Phones 2-2101, 5316

Corpus Christi, Tex.

MICHIGAN

Drilling Revival Under Way In Isabella County

SAGINAW.—A revival of drilling activity is under way in Isabella County with Sohio Petroleum Co. at work on four gas projects in Coldwater Township and C. W. Collin beginning two oil tests in Nottawa Township. Another northern Michigan development has been undertaken by Eugene Hilliard, who has taken out eight state permits for operations in Roscommon Township, Roscommon County.

The field-operations picture was improved in the past week, operators reporting a total of 22 completions for 5 oil wells, 7 gas wells and 10 dry holes, 6 of which were wildcats. Major interest centered on the Rowmor Corp. 1 Carr, in Section 5, Lincoln Township, Osceola County, which ran 619 bbl. in a 15¼-hour open test. Other producers ran from 22 to 150 bbl., one each in Allegan, Bay, Kent, and Van Buren counties. Most of the 46,500,000-cu. ft. production of natural gas was in five Consumers Power Co. drillings in Marion Township, Osceola County.

Dry holes included a Pure Oil Co. deep test in Brookfield Township, Huron County, a wildcat failure at 4,450 ft. Another dry deep test was Sohio 1 Burton, temporarily abandoned at 5,112 ft., plugged back to 5,033 ft. in Orient of Osceola.

While 5 locations were abandoned, a total of 31 new locations in 14 counties were announced. In addition to the six in Isabella and eight in Roscommon, five are in Allegan County, two in Barry, one each in Bay, Clare, Gratiot, Kent, Iosco, Mecosta, Muskegon, Ottawa, Midland, and Saginaw counties.

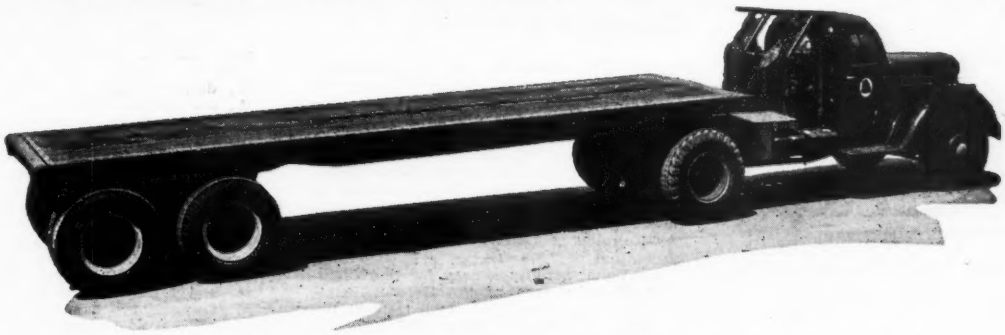
MICHIGAN WILDCAT FAILURES

Allegan County, Manlius Township: J. W. Lang Co. 1 W. J. Maley, SW NW SE 21-3n-15w, dry in Traverse limestone, TD 1,404 ft.

Huron County, Brookfield Township: Pure Oil Co. 1 Henry Schreiber, C N½ NW NW 7-15n-10e, dry in Sylvania formation, TD 4,450 ft.

Isabella County, Lincoln Township: H. E. Bell 1 I. R. Meyers, NW SW NE 36-13n-4w, dry in Dundee, TD 3,577 ft.

A RUGGED-DUTY OIL FIELD TRAILER



Our Model S-F 42-T tandem platform, illustrated above, is constructed to handle the extreme load weights common to oil field hauling.

Embodying three-point suspension, this trailer distributes load weights evenly over the tandem axle assembly. Construction of frame at center and sides is specially engineered to withstand the stress of maximum loads. The roll type tail board permits rear loading.

This equipment is tried and proven, being used currently throughout the entire Mid-Continent area by oil field truck operators and producers.

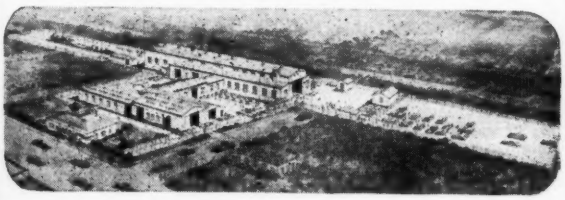
Prompt delivery of this model is assured.

AMERICAN BODY & TRAILER COMPANY

Amarillo, Texas
740 North Grand

Main Office—Oklahoma City
1500 Exchange Avenue

North Little Rock, Ark.
3131 East Broadway



FACILITIES TO DO THE JOB!

Manufacturers and fabricators of all types of welded sheet and steel plate products. Facilities to do the job whether large or small. Engineering skill backed by constant research. All equipment is designed, manufactured and supervised by men who have had many years experience in steel plate construction.

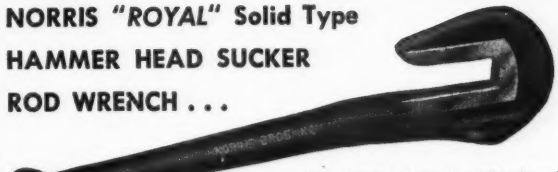
TANKS BY BOLT

DALLAS TANK Company, Inc.

201-5 W. COMMERCE ST., P.O. BOX 5387
DALLAS, TEXAS

BUILT TOUGH
To Take Plenty of Punishment!

NORRIS "ROYAL" Solid Type HAMMER HEAD SUCKER ROD WRENCH . . .



Drop-Forged Alloy Steel, Machined and Hardened Jaw, Perfect Balance

NORRIS "BUMP-UP" Hinged Type SUCKER ROD WRENCH . . .

Drop-Forged, Heat-Treated Alloy Steel Jaw; Perfect Balance; Opening Machined to Exact Dimensions

AT YOUR FAVORITE SUPPLY STORE

Norris Brothers, INC.
ROBINSON · ILLINOIS

Nottawa Township: Merrill Drilling Co.-Clayton Development Co. 1 Elizabeth Maybee, NE SE SE 12-15n-5w, dry in Dundee, TD 3,784 ft., plugged back to 3,778 ft.

Montcalm County, Douglass Township: Paul B. Whitney 1 Bentley & Black, SW SE NE 28-11n-7w, dry in Dundee, TD 3,423 ft.

Van Buren County, Arlington Township: Stuart L. Godfrey 1 J. C. and L. E. Cuber, SE SE NE 9-2s-15w, dry in Traverse limestone, TD 1,175 ft.

TEXAS GULF COAST

Standard Test Gages 288 Bbl. of Oil Per Day

HOUSTON.—Standard Oil Co. of Texas 1 State-Galveston Bay, Lease 27129, located 1 mile northeast of Redfish Reef field production and several miles southwest of the Smith Point field, in Galveston Bay, Chambers County, on Section 201, gaged 288 bbl. of 53°-gravity condensate per day through a ¼-in. choke. Tubing pressure 2,250 lb., gas-oil ratio 11,490 to 1, with no water in the flow. Drilled to a total depth of 11,390 ft., this well is producing through perforations at 8,752-66 ft.

Sun Oil Co. is preparing to test its deep wildcat 3,500 ft. southeast of nearest production in the Midfields pool of Matagorda County. The 1 Stovall is located in I&GN Survey 4, Block 6. Drilled to a total depth of 10,325 ft., the 5½-in. production string was stuck 5 ft. off bottom where it has been cemented for a production try. New deep sands are reported to have been picked up; however, they are all probably gas-bearing sands. Regular producing levels of the Midfields pool are in the 9,000 and 9,100-ft. levels.

Superior Oil Co. 1 Harry Brown, wildcat test in the Magnolia discovery area of Montgomery County, in William Hillhouse Survey, is drilling below 10,318 ft., and operators plan to log the hole at 10,425 ft. They are still looking for sands comparable to the Lake Creek "E" sands. Top of the Wilcox was encountered in this test at 8,110 ft., and sands comparable to Lake Creek "B" sands were picked up in cores taken from 9,555-95 ft. Operators will start coring again at 10,500 ft.

Jack W. Frazier 1 Houston Deep Water Land Co. wildcat in the Deep Water-Deer Park area of Harris County, has been completed dry at a total depth of 8,602 ft. This test blew dry gas out of control for a short time while drilling at 8,379 ft., and when operators started pulling the pipe, it became lodged and took several weeks of cutting and pulling to recover.

Only one wildcat start was reported for the Upper Gulf Coast district, being in Lavaca County. The development-well starts total 12, with Hardin, Harris, and Matagorda counties receiving 2 each and Brazoria, Chambers, Jackson, and Polk counties 1 each. There were 14 completions, 9 oil, 3 gas, and 5 dry. Three of the five dry holes were wildcats, two in Harris and 1 in Fort Bend counties. Fort Bend County received the greatest activity with four completions reported.

UPPER GULF COAST WILDCAT FAILURES

Fort Bend County: Geo. H. Echols 1 Mrs. Mary D. Myers, in Wiley Martin Survey, 5 mi. SE of Richmond townsite, dry, TD 8,012 ft.

Harris County: J. W. Frazier 1 Houston Deepwater Land Co., in Thos. Earl Survey in Deer Park-Deepwater area, dry, TD 8,602 ft.

Jack W. Frazier 2 R. E. Brooks Estate, in Richard & Robert Vince Survey, in Deepwater area, dry, TD 8,215 ft.

OKLAHOMA

Southwest Maysville Pool Extended Northward

BROMIDE production in the Southwest Maysville field of Garvin County has been extended about 1 mile northward by the completion of Standard of Kansas 1 Eskridge, NE SW SW 18-4n-2w. The 1 Eskridge flowed 501 bbl. of 44°-gravity oil in 24 hours through a 20/64-in. choke. Pressure on the casing was recorded at 2,000 lb., with 1,400 lb. on the tubing. Production was through perforations opposite the Bromide at 7,362-72 ft. with casing set on bottom at 7,376 ft.

Additional activity is seen for the Northwest Wewoka area of the Greater Seminole field as a result of swab tests at the R. Olsen et al 1 Jennings, SW NW NW 10-8n-8e. When plug was pulled to retest the Cromwell sand at 3,225-50 ft., the well swabbed at the rate of 10 bbl. of oil an hour through the casing. Latest reports indicate that operators may perforate opposite a lower zone in order to obtain sufficient gas to flow the well. Several new wells have already been staked nearby, and more are expected in the near future.

In Cotton County, Martin Properties 1 Dyer, SW SW SE 33-2s-11w, 1 mile north of the Soldier Creek field, has been completed and is making 25 bbl. of oil an hour through tubing from sand at 1,649-56 ft. Offsets have been staked on all sides and a fast campaign is expected to determine whether the well is an extension of the Soldier Creek field or the discovery of a new field. Production in the entire field is pinched back at present until Stanolind can complete a new line into the field.

OKLAHOMA SUCCESSFUL WILDCATS

Okfuskee County: Mid-Continent 1 C. H. Baker, SE NE NW 31-12n-7e, discovery, pumped 20 bbl. of 29°-gravity oil per day from 2,944-50 ft.; Oswego 2,869 ft., Prue 2,928 ft., Skinner 3,077 ft., Bartlesville 3,164 ft., sand 3,399 ft., Wapanucka 3,822-40 ft., Hunton 4,310 ft., TD 4,361 ft.

Seminole County: Smith-Horton Drilling 1 Letka, NE NE NE 32-8n-7e, discovery north of East Little River, flowed 105 bbl. of 34°-gravity oil per day, through ¼-in. tubing choke, from Cromwell at 3,278-94 ft.; Upper Calvin 1,930-46 ft., Lower Calvin 2,082-103 ft., Senora lime 2,369 ft., broken sand 2,455-62 ft., brown lime 3,105 ft., Booch 3,190-225 ft., sandy lime 3,268-78 ft., TD 3,294 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Griffin & Barbre 1 Ehlman, SE SE SE 6-1s-10w, dry, TD 2,790 ft., Cisco 1,250 ft., sand 1,568-90 ft., lime 1,749-945 ft., 1,956-2,030 ft. and 2,076-91 ft., hard conglomerate 2,185-89 ft., lime 2,193-408 ft., sand 2,502-04 ft.

Kadane & Sons 1 Schupert, NW NW NW NE 26-1s-14w, dry, TD 1,394 ft., granite wash 600 ft., Arbuckle 1,215 ft.

Cotton County: O. L. Ledgerwood 1 Pruitt, SE SE NW 33-2s-12w, dry, TD 2,008 ft., Fusilinid lime 1,758 ft., Megargel lime 1,901 ft.

S. D. Johnson 1 Helton, NW NW NW SE 16-3s-13w, dry, TD 1,705 ft., no tops reported.

W. R. McClelland 1 White, C NW SW 4-3s-13w, dry, TD 2,524 ft., conglomerate 2,094-105 ft., shale with sand streaks 2,200-90 ft., Cisco 2,375 ft., white sand 2,430-52 ft., lime 2,452-60 ft.

Garvin County: W. G. Garrison 1 Billman "A," NE NW NW 16-2n-3e, dry, TD 1,953 ft., sand 1,398-414 ft.

Pruitt & Adams 1 Cozad, NW NE SE 16-2n-3e, dry, TD 1,500 ft., no tops reported.

Sohio 1 Tipton, NW SE NW 21-3n-1e, dry, TD 3,944 ft., sand 3,501 ft., Bromide dense 3,590 ft.

Mid-Continent 1 Moness, NW SW SE 18-3n-1w, dry, TD 5,712 ft., Detrital zone 4,918-32 ft., Viola 5,163 ft., 1st sand 5,578 ft., 2nd sand 5,673 ft.

Lincoln County: Texola 1 Seaba, NE NE SE 17-14n-3e, dry, TD 5,175 ft., Avant 2,820 ft., Layton 3,150 ft., Oswego 4,095 ft., Prue 4,150 ft., Inola 4,512 ft., Bartlesville 4,525 ft., Mayes 4,692 ft., Woodford 4,780 ft., Sylvan 4,906 ft., Viola 5,005 ft., dolomite 5,056 ft., Wilcox 5,092-109 ft., 2nd Wilcox 5,142-74 ft.

Payne County: J. M. Huber Corp. 1 Allen, SE SE SE 2-23n-5e, dry, TD 3,060 ft., sand 2,383-98 ft. with an odor of oil, Big Lime 2,540 ft., Oswego 2,690-716 ft., Mississippi lime 3,050 ft.

Pottawatomie County: Hubbell & Webb and Mid-Continent 1 Louther, NE SE SE 33-7n-4e, dry, TD 3,597 ft., Pawhuska 1,090 ft., Belle City 1,920 ft., Hogshooter 2,250 ft., Upper Layton 2,280 ft., Lower Layton 2,320 ft., Calvin 3,352-58 ft., Earlsboro 3,522-27 ft.

Seminole County: Norbla Oil 1 Black, SE NW NW 10-9n-7e, dry, TD 3,740 ft., Calvin 2,310 ft., Senora sand 2,631 ft., Thurman 3,011 ft., Inola 3,220 ft., Bartlesville 3,225 ft., brown lime 3,395 ft., Booch 3,495-510 ft., Wapanucka 3,678 ft., Cromwell 3,695 ft.

Stephens County: Philco Drilling 1 Graham, NW SW SE 7-1n-5w, dry, TD 2,774 ft., sand 2,038-50 ft. with slight stain of oil, broken sand with slight stain of oil, sand 2,270-85 ft., 2,300-30 ft. and 2,438-11 ft. with no show.

Lundy & Shear 1 Dolen, SE SW NW 17-1s-8w, dry, TD 2,255 ft., sand 2,240 ft.

ILLINOIS

Moultrie County Wildcat To Be Tested on Pump

MATTOON.—Ben J. Taylor is installing pump for production tests at his prospective discovery 6 miles west of the Mattoon field, the 1 John D. Hardinger, SW SW NE 21-12n-6e, Moultrie County. This well, drilled to a total depth of 2,011 ft., encountered saturation in the Aux Vases sand at 1,933-67 ft., and on preliminary tests made ½ bbl. of oil and 1½ bbl. of salt water per hour.

Paul Doran and Delta Refining Co. 1 A. A. Millican estate, SW SW SE 16-3n-4e, Marion County wildcat, has set pipe on the McClosky lime at 2,489-95 ft., and is waiting on cement to set. Previously a 1-hour drill-stem test at 2,474-95 ft. resulted in the recovery of 2,345 ft. of gas, 100 ft. of oil and 60 ft. of oil-cut mud. Total depth is 2,495 ft. This well is approximately 8 miles northwest of the Xenia pool of Clay County and about 10 miles northeast of the Tonti pool of Marion County.

Illinois completions for the week totaled 46, of which 24 were oil wells and 22 were dry holes, 12 of the latter being wildcats. Exploratory activity continued a downward trend as only 7 of the 44 new operations announced during the week were wildcats. These were located one each in Gallatin, White, Hancock, Hamilton, Fayette, Edgar and Jefferson counties.

ILLINOIS WILDCAT FAILURES

Bond County: Sohio & Eason 1 E. Long, NE SE NE 26-6n-5w, dry at 2,768 ft., Devonian 1,855 ft., Trenton 2,623 ft.

Champaign County: D. K. Roth 4 Reynolds, NW SW NE 1-2n-7e, dry at 292 ft., no log.

Clay County: National Associates Petroleum Co. 1 C. Friend, SW SW SW 17-3n-6e, dry at 3,076 ft., Hardinsburg 2,401 ft., Benoist 2,752 ft., Ste. Genevieve 2,942 ft., McClosky 2,999 ft.

R. Halbert 1 Street, S ½ NE SE 14-2n-5e, dry at 3,051 ft., Glen Dean 2,359 ft., Cypress 2,521 ft., Benoist 2,689 ft., Aux

Why Mission Valves give more service per dollar

REPLACEABLE BUSHINGS INCREASE VALVE SEAT LIFE

A small replaceable bushing takes the wear instead of the more expensive valve seat—increasing valve seat life many times. This means lower replacement costs and less time spent changing valve seats. Since the seat stays in the pump longer without removal, danger of washouts between seat and deck is reduced.

EXTRA STRONG VALVE SEAT ASSURES LONG SERVICE

Mission valve seats are made from strong alloy steel forgings. Recent developments assure even stronger cross arms and adequate fluid passage. This extra strength means long life and low replacement costs.

COMPOUND 308* INSERTS GIVE LONGER LIFE

These inserts last from three to five times longer than regular inserts in ordinary mud, and up to ten times longer than ordinary oil-resisting inserts in hot mud, treated mud, or oil and gas. This means lower valve costs and greater freedom from slush pump valve troubles.

DESIGN OF MISSION INSERTS ALSO MAKES FOR LONG LIFE

The insert does not bear the weight of the valve in closing. It is held lightly in contact with the valve seat and seals positively by fluid pressure. The extra large sealing surface means that the insert will take more wear before failing. Mission's combination of durable Compound 308* and advanced design assures economical, trouble-free valve inserts.

* Registered United States Patent Office

GUARANTEE

If a competitive test in your pumps does not prove that Mission Slush Pump Valves (with Compound 308 inserts) are more economical than the valves you are now using, the entire purchase price of these valves will be promptly refunded.

It's Mission the world over because with Mission it's "Change the bushing and save the seat." Be safe and save . . . Specify Mission Valves.

Mission Manufacturing Co.
HOUSTON TEXAS

6A-5

EXPORT OFFICE: Room 1636, 30 Rockefeller Plaza, New York 20, N. Y.

SOLD THROUGH SUPPLY STORES EVERYWHERE

MISSION SLUSH PUMP VALVES . . . MISSION FLUID END PISTONS . . . MISSION PISTON RODS
MISSION GLAND PACKINGS . . . MISSION SLIPS . . . MISSION SWABS . . . MISSION PLUG VALVES

Vases sand 2,810 ft., Ste. Genevieve 2,850 ft., McClosky 2,890 ft.

Jefferson County: Keating Drlg. Co. 1 E. Nelson, SE NW SW 11-1s-1e, dry at 2,360 ft., Glen Dean 1,734 ft., Benoist 2,068 ft., Ste. Genevieve 2,274 ft.

Lawrence County: C. R. Craft 1 Welsh, NE NE NW 14-3n-11w, dry at 1,907 ft., Rosiclare 1,833 ft., McClosky 1,852 ft.

Perry County: John E. Soper 1 Brown, NE NW NE 10-6s-4w, dry at 1,437 ft., Tar Springs 875 ft., Glen Dean 958 ft., Cypress sand 1,175 ft., Benoist 1,300 ft.

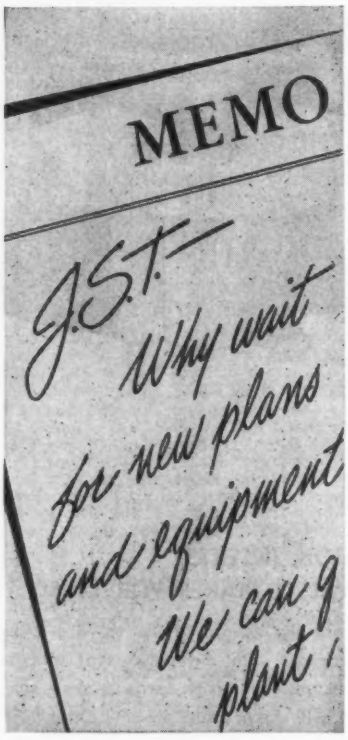
Shelby County: National Associated Petroleum Co. 1 B. S. Gawthrap, NW NE SW 22-10n-6e, dry at 2,266 ft., Tar Springs 1,756 ft., Glen Dean, 1,857 ft., Cypress sand 1,981 ft., Aux Vases sand 2,151 ft., Ste. Genevieve 2,210 ft.

Wabash County: C. E. Skiles 1 Brines, NW NE NE 8-1s-13w, dry at 2,828 ft., Glen Dean 2,177 ft., Cypress sand 2,434 ft., Benoist 2,547 ft., Ste. Genevieve 2,716 ft., Levias 2,744 ft.

Wayne County: Eagle Drlg. Co. 1-A Illinois Farm Corp., SW SW SE 15-1s-5e, dry at 3,193 ft., Glen Dean 2,500 ft., Cypress sand 2,736 ft., Aux Vases sand 2,994 ft., Ste. Genevieve 3,049 ft., Levias 3,059 ft., Fredonia 3,107 ft., McClosky 3,115 ft.

White County: Arrow Drlg. Co. 1 E. Turner, SE SE SE 30-6s-9e. dry at 3,209 ft., Tar Springs 2,490 ft., Glen Dean 2,575 ft., Cypress sand 2,801 ft., Benoist 3,005 ft., Aux Vases sand 3,086 ft., Ste. Genevieve 3,107 ft., McClosky 3,193 ft.

Williamson County: Frank Strickland 1-A Huskey-Biehl, W½ SE SW 6-8s-3e, dry at 2,725 ft., Tar Springs 2,160 ft., Glen Dean 2,209 ft., Cypress sand 2,586 ft., Paint Creek 2,651 ft., Benoist 2,684 ft.



SEE PAGE 30

LOAD BINDERS

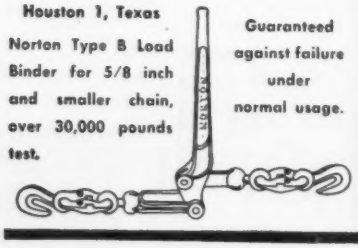
FOR OIL FIELD HAULING

Norton drop forged, heat treated steel load binders (Boomers) for heavy duty service are now available for immediate delivery. Order them through your regular jobber.

NORTON

EQUIPMENT CO., Inc.
P. O. Box 1185
Houston 1, Texas

Norton Type B Load Binder for 5/8 inch and smaller chain, over 30,000 pounds test.



Guaranteed against failure under normal usage.

APPALACHIAN FIELD

Rotary Wildcat Drilling In Williamsburg District

PITTSBURGH.—In Williamsburg district, Greenbrier County, West Virginia, The Texas Co. is now drilling in the Marcellus shale in the rotary wildcat on G. R. Dean farm. The formation was topped at 5,204 ft. from a surface elevation of 2,575 ft. and was cored from 5,199-5,209 ft. and the 10 ft. of core recovered.

In Greenbrier district, Summers County, an important new test is starting on the W. M. Elswick farm by Godfrey L. Cabot, Inc. Surface elevation is 1,526 ft. Summers County has been very sparsely tested with but four recorded wells and is just east and southeast of Raleigh County where extensive work is being done. In the southern area of West Virginia, notable success has been had west of Summers County, particularly in Wyoming County.

In Center district, Wyoming County, Hope Natural Gas Co. completed 9,016, a test on Agnes N. Wittenburg farm with a final open flow of 3,723,000 cu. ft. of gas, natural, from the Berea; elevation 1,441 ft., Sunbury shale 3,402-20 ft., Berea 3,437 ft., gas 3,443-56 ft., total depth 3,460 ft. In this district and in Baileysville, Oceana and Huffs Creek districts, 31 wells are actively drilling.

In Elk district, Kanawha County, United Natural Gas Co. was forced to set 5-in. casing at 4,251 ft. in the Oriskany test on the John A. Boggs farm on account of oil struck at 3,615 ft.

New work totaled 11 and in Elk district, Barbour County, Big Sandy and Elk districts, Kanawha County; Murphy district, Ritchie County; Grant district, Wayne County.

The Young pool in North Strabane Township, Washington County, Pennsylvania, was widened to the south with completion of Keystone Gas Co. No. 4 Markle (David Templeton) which is estimated good for 25 bbl. with the Fifty Foot sand 2,303 ft., oil 2,331-34 ft. and 2,337-51 ft., total depth 2,599 ft. To the west Ed Beedle et al completed 2 Buckheit (R. L. Munce) which is also estimated good for 25 bbl. from the Gantz and Gordon sands, 2,410 ft., oil 2,440-43 ft., total depth 2,452 ft.

In Washington district, Indiana County, Peoples Natural Gas Co. completed a fair gas well in the test George M. Brown which gaged 696,000 cu. ft. gas, Tiona sand, total depth 2,908 ft.

In Patton Township, Allegheny County, the scene of a large recent gas completion, four new locations have been made: Peoples Natural Gas Co. 1 H. A. Walker, Acme Drilling Co. 1 John Tweedy, Petroleum Drilling Co. 1 Mary Elliot, T. W. Phillips Gas & Oil Co. 1 Miller & Solomon.

KANSAS

Marion County Wildcat Producing 12 Bbl. Hourly

ANDERSON - PRICHARD OIL CORP. 1 Weyand, SE NW SW 27-19-1e, Marion County wildcat, in preliminary tests during the past week averaged 12 bbl. of oil an hour from the Simpson sand at 3,289-3,311 ft. This well climaxes the attempts of 9 operators to open production in this area, with 10 wildcats previously drilled during this year resulting in failure. In addition to the Simpson production, oil saturation was also encountered in the Viola at 3,211-16 ft. and gas saturation in the Mississippi at 2,827-42 ft. Nearest production is 7 miles to the west in the Ritz Canyon field of McPherson County.

The Texas Co. has given Ellis County another new oil pool at the 1 Dreiling, SW SW SW 15-13-17w, wildcat ½ mile southwest of the town of Catherine. In a preliminary test the well averaged 20 bbl. of oil in an hour from the Arbuckle lime at 3,560-93 ft. It is rated at 559 bbl. daily.

KANSAS WILDCAT FAILURES

Barton County: Sohio et al 1 Hertach, SW SW SE 12-18s-11w, dry, TD 3,385 ft., anhydrite 570 ft., Lansing-Kansas City 3,009 ft., conglomerate 3,300 ft., Arbuckle 3,335 ft.

Brown County: Stanolind Oil & Gas 1 A. W. Wikle, NW NW SW 10-2s-15e, dry, TD 3,435 ft., Lansing-Kansas City 1,284 ft., Mississippi lime 2,592 ft., Kinderhook 2,755 ft., Hunton 3,036 ft.

Butler County: Aylward and H & M Drilling 1 Womack, NE NW NE 19-28s-6e, dry, TD 3,191 ft., Lansing-Kansas City 1,761 ft., Kansas City 2,147 ft., Bartlesville sand 2,691 ft., Mississippi lime 2,773 ft., Basal Mississippi lime 3,072 ft., Arbuckle 3,173 ft.

Cowley County: Earl Wakefield 1 "C" Ogilbee, SW NE NE 7-32s-4e, dry, TD 2,015 ft.

Ellsworth County: Cities Service Oil 1 Cook "B," NE NE SW 19-14s-10w, dry, TD 3,177 ft., anhydrite 455 ft., Lansing-Kansas City 2,775 ft., sandy conglomerate 3,123 ft., cherty conglomerate 3,135 ft., Arbuckle 3,139 ft.

Gove County: Superior Oil 1 Preifeit "H," SW SW SW 32-13s-29w, dry, TD 4,753 ft., anhydrite 2,205 ft., Lansing-Kansas City 3,840 ft., Mississippi lime 4,472 ft., Viola 4,658 ft., Arbuckle 4,698 ft.

McPherson County: E. H. Adair et al 1 Sheffer, C N/2 NW NW 3-18s-1w, dry, TD 2,716 ft., Lansing-Kansas City 2,115 ft., Mississippi lime 2,703 ft.

Meade County: Helmerich & Payne et al 1 R. E. Adams, C SW SW 11-35s-29w, dry, TD 6,250 ft., St. Genevieve 6,112 ft., Ft. Riley 1,976 ft., Lansing-Kansas City 4,305 ft., Morrow 5,735 ft., Mississippi lime 5,865 ft., Fredonia 6,215 ft.

Norton County: Derby & Peel 1 Foland, NE NE NE 8-1s-21w, dry, TD 3,775 ft., anhydrite 1,904 ft., Topeka 3,258 ft., Lansing-Kansas City 3,411 ft., Basal Kansas City 3,633 ft., Arbuckle 3,723 ft.

Rooks County: Skelly Oil 1 Willie Gick, NW NE SW 30-10s-17w, dry, TD 3,067 ft., Heebner 3,285 ft., Dodge 3,297 ft., Lansing-Kansas City 3,322 ft., conglomerate 3,589 ft., Simpson 3,665 ft., Simpson dolomite 3,674 ft., Arbuckle 3,694 ft.

Rush County: Darby & Bothwell et al 1 Thalheim, NE NE NW 10-19s-18w, dry, TD 3,869 ft., sand 540 ft., anhydrite 1,153 ft., Topeka 3,130 ft., Heebner 3,380 ft., Toronto 3,404 ft., Lansing-Kansas City

3,426 ft., Basal Kansas City 3,710 ft., Arbuckle 3,814 ft.

Scott County: Snyder and Atlantic Refining 1-D Mark, C SE SW 7-20s-33w, dry, TD 4,882 ft., Herrington 2,638 ft., Krider 2,685 ft., Winfield 2,736 ft., Ft. Riley 2,796 ft., Lansing-Kansas City 3,900 ft., Mississippi lime 4,796 ft.

Sumner County: Schneider & Cameron 1 Shepard, SW SE NW 1-32s-2e, dry, TD 2,626 ft., Kansas City 2,572 ft.

NEBRASKA WILDCAT FAILURE

Furnas County: Stanolind Oil & Gas 1 K. Bruntz, NW NW NE 25-4n-21w, dry, TD 3,646 ft., Tarkio 2,994 ft., Topeka 3,165 ft., Lansing-Kansas City 3,326 ft., conglomerate 3,575 ft., granite wash 3,626 ft., granite 3,638 ft.

CANADIAN FIELDS

Shell Continues Development In Jumping Pound Area

CHATHAM.—In the Jumping Pound area west of Calgary, Shell Oil Co. of Canada is continuing development following completion of Shell 16-14-J, LSD 16, 14-25-5w5, with Madison limestone at 10,335-578 ft. With testing still uncompleted, Shell 5-7-1 has been located in LSD 5, 7-25-4w5, south and west of Shell 4-24-J, LSD 4, 24-25-5w5, the discovery well. The latter got the Madison high on structure and finished at 9,947 ft. with initial gas flow around 20,000,000 cu. ft. and a small recovery of light crude. The well since completion in December 1944 has produced 750,000,000 cu. ft. of gas without any noticeable pressure decline, and the company has decided to continue drilling primarily to test the gas reserves of the field.

Steveville.—In the Steveville - Princess field, southern Alberta, South Princess Joint Venture C.P.R. 3, LSD 12, 8-19-11w4, bottoming at 3,326 ft., was placed on production after swabbing, making 63 bbl. of water-free 27°-gravity oil through 9/64-in. choke. After acidizing, the well flowed under its own power 107 bbl. in 13½ hours through 10/64-in. choke, and later tests show 180 bbl. a day with a small percentage of mud and 165,000 cu. ft. of gas. Pressure on casing is 1,150 lb. and on tubing 790 lb. Production is from the Madison limestone, and indications are the water encountered in earlier producers may have come from the underlying Devonian. Princess-Brooks Syndicate 2, LSD 3, 21-19-13w4, is testing Madison limestone at 3,386 ft.

Del Bonita.—In the Del Bonita field, southern Alberta, McLeod-Del Bonita 1, LSD 13, 14-1-21w4, with Madison contact at 4,915 ft., has drilled into porosity at 4,963-65 ft. with strong gas shows and is changing to cable tools to deepen 30 ft. before testing.

Lloydminster.—In the Lloydminster field, D.B. 1, LSD 6, 13-48-28w3, blew into production while plug was being drilled and ran wild for 3 hours with flow estimated more than 11,000,000 cu. ft. The gas shot the bit over the derrick. Control head has been installed and after a squeeze-cement job, test for oil production will be made. The well, sponsored by the Northeast Syndicate, extends the producing area for 4 miles. Withers-Groat-Furness 1, LSD 16, 12-48-28w3, less than a mile southeast, bottoming at 1,847 ft., has set casing at 1,841 ft. and looks like a good producer. Oil & Gas-Husky 3 has finished at 2,252 ft. and is waiting for gun perforation and testing.

Northern Alberta.—In Northern Alberta, Elk Point 3, LSD 15, 35-57-5w4, has drilled through over 1,000 ft. of salt beds at below 4,900 ft. and will continue to the granite. Imperial-Deville 2, LSD 11, 36-51-19w4, was dry at 2,620 ft.

Kinsella.—In the Kinsella field, east-central Alberta, Imperial-Kinsella 23, LSD 11, 6-49-11w4, is finishing in the Viking sand around 2,053 ft. with a gasser indicated.

Alberta completions.—Latest official summary of Alberta completions shows seven gassers in various parts of the province aggregating 48,200,000 cu. ft. with three oil wells totaling 703 bbl. initial production. Completions are as follows:

Turner Valley: Royalite-Lowery 6, LSD 16, 10-20-3w5, Madison at 8,480-8,714 ft., 568 bbl. 40°-gravity oil with 728,000 cu. ft. gas.

Baxter Lake.—Baxter Lake Oils 1, LSD 16, 20-46-5w4, TD 2,088½ ft., 35 bbl.

Elk Point 1-A, LSD 7, 26-56-5w4, TD 1,653 ft., 3,142,000 cu. ft. of gas. Elk Point 2, LSD 3, 14-57-6w4, TD 4,359 ft., dry.

Kinsella: Imperial 16, LSD 6, 6-46-8w4, TD 2,146 ft., 2,060,000 cu. ft. gas. Imperial 20, LSD 10, 32-46-9w4, TD 2,112 ft., 5,050,000 cu. ft. gas. Imperial 21, TD 2,143 ft., dry.

Provost: Imperial 4, LSD 6, 28-37-2w4, TD 2,551 ft., 2,100,000 cu. ft. gas.

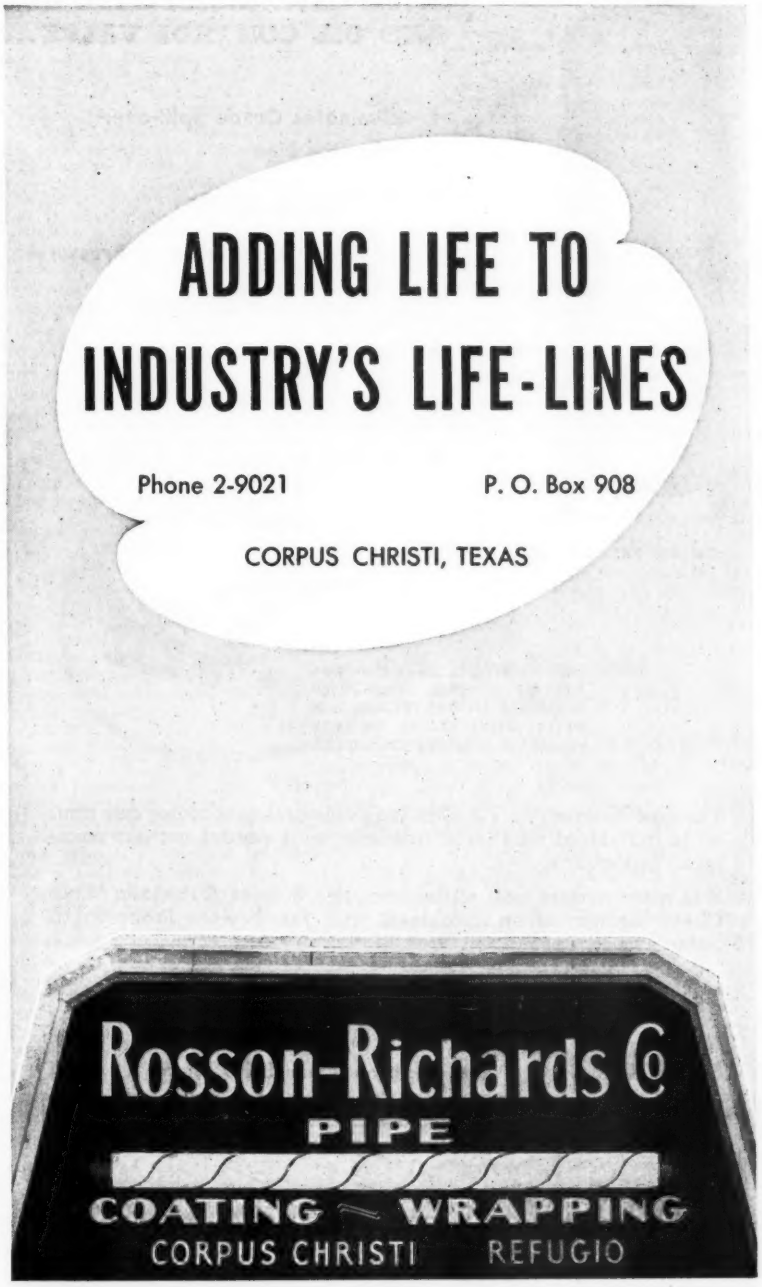
Pinhorn Dome: McColl-Union 4B-16-3-8, LSD 4, 16-3-8w4, TD 2,202 ft., 8,000,000 cu. ft. gas.

Lloydminster: Lloydminster Oil Producers 3, LSD 13, 11-50-2w4, TD 2,003 ft., 100 bbl. 14.4°-gravity oil.

Medicine Hat: Medicine Hat 72, LSD 6, 7-13-4w4, TD 1,150 ft., 4,120,000 cu. ft. gas.

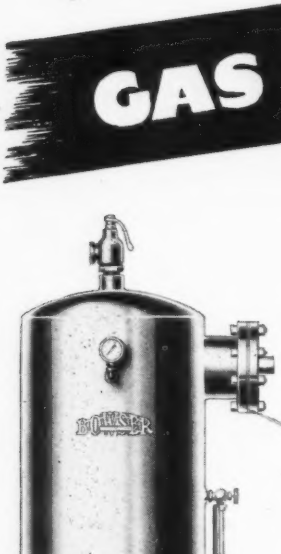
Steveville: Princess Brooks Syndicate C.P.R. 1, LSD 13, 17-19-13w4, TD 3,415 ft., 23,000,000 cu. ft. gas.

Fort Norman.—Increased demand for gasoline, fuel oil and petroleum products in the mining areas of the Canadian north has resulted in a stepping up of production from the Norman Wells field and the Imperial refinery. Under normal conditions the plant has been producing about 30,000 bbl. of refined products to meet the northern demand, but this year the run is expected to exceed 140,000 bbl. with a 200,000-bbl. output in prospect for 1947. In prewar



The New— BOWSER ESTABLISHED 1885

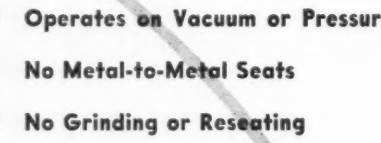
GAS TRAP ... for OIL WELLS



WITH NEW..SIMPLIFIED GAS AND OIL CONTROL VALVE...

- Eliminates Crude Spill-over into Gas Line
- No Packing Glands
- Operates on Vacuum or Pressure
- No Metal-to-Metal Seats
- No Grinding or Reseating
- Positive Action
- Nothing to Get Out of Order

FIG. 426 GAS TRAP



THIS PATENTED, SIMPLIFIED GAS AND OIL CONTROL VALVE—USED IN THE FIG. 426 GAS TRAP—MAKES METER INSTALLATIONS ON INDIVIDUAL WELLS MORE ECONOMICAL.

The new Bowser Fig. 426 Gas Trap efficiently separates gas from oil in individual well installations or as a central unit for small lease operations.

It is an important part of the complete Bowser Automatic Well-Check System when combined with the Bowser Proportional Sampler and Special Oil Well Meter.

Write today for complete details on the new Bowser Gas Trap.

BOWSER, INC., 1328 Creighton Avenue, Fort Wayne 2, Indiana

LIQUID CONTROL SPECIALISTS SINCE 1885

Rotor Meter | Gas Trap | Portable Transfer Unit | Xacto Well Meter | Pipe Sealing Compound | Industrial Xacto

years the refinery usually operated from May to October, but this year it will continue producing for storage till about December 15.

OHIO, KENTUCKY

Richville Pool Gets One of Best Wells Yet

COLUMBUS.—One of the best wells yet completed in the Richville pool was drilled in by East Ohio Gas Co. on the Stark County Commissioners, Section 32, Perry Township, Stark County. White Clinton, 4,262-90 ft., gaged 3,108,000 cu. ft. natural and 6,000,000 cu. ft. with a rock pressure of 1,375 lb. when shut in after shot.

Ray Pennick et al 1 Sherman Forsyth, Section 21, Madison Township, Perry County, found the Clinton at 3,299-3,359 ft. with an oil show which made an estimated 50 bbl. after shot.

Zanesville Tool & Supply Co. picked up a gas well along the west edge of the Clayton pool with natural open flow of 1,750,000 cu. ft. The well, 3 S. I. Forsyth, Section 1, Reading Township, Perry County, reached the Clinton at 3,115 ft. and finished at 3,140 ft.

Ohio Fuel Gas Co. 1 F. S. Boone, Lot 47, La Grange Township, Lorain County, made 564,000 cu. ft. natural in the lower Clinton, and extended the North pool a location to the south. Clinton came in at 2,430-34 ft. In Penfield Township, Ohio Fuel 1 Roy Riebel, Lot 53, missed the upper Clinton but picked up the lower sand at 2,594-2,602 ft. with 297,000 cu. ft. natural.

Ashland field reported five locations and was followed by Cambridge and Sandyville with three each, Stewart with two, and Lancaster one. Twenty-six wells were completed with Ashland leading with six.

WILDCAT FAILURES COMPLETED IN OHIO

Ashland County, Sullivan Township: Ditch & Gerigs 1 Jas. W. Moore, Lot 89, no Clinton, TD 2,614 ft.

Meigs County, Orange Township: Theiss Oil & Gas 1 Albert D. Cole, Sec. 16, Berea 1,642-51 ft., TD 1,651 ft.

WESTERN KENTUCKY

OWENSBORO.—H. H. Weinert 1 J. R. Breeden, 23-L-26, Hopkins County wildcat, is shut down for orders after perforating pipe opposite the Pennsylvanian sand at 1,530-48 ft. A 24-hour swab test of this zone produced only salt water with only a slight show of oil. Total depth is 2,880 ft.

In Henderson County the Fisher Oil Co. 1 W. I. Pritchett, 24-O-22, wildcat test 2 miles west of Dixie, is drilling ahead below 2,604 ft. From an elevation of 413 ft. the Barlow was topped at 2,261 ft. and the Ste. Genevieve at 2,571 ft.

Two oil wells, two gas wells and two dry holes were completed in the western Kentucky area during the past week. None of these were wildcat tests. Eight new operations, all field development wells, were announced during the week and included five in Daviess County and one each in Henderson, Hopkins and McLean counties.

INDIANA

EVANSVILLE.—In Gibson County, the Henry Smith et al 1 Owen Beloat, NW NW 8-2s-10w, is showing promise of opening the first oil production from the Cypress sand in that area after swabbing at the rate of 50 bbl. daily. Cypress saturation was encountered at 1,827-30 ft., and at a total depth of 1,830 ft. the well was still in saturated sand. Operators are now preparing to shoot the sand, and if good production is developed, a townsite drilling boom in the nearby town of Princeton

might result. Nearest production to the well is in the West Francis pool about 3 miles to the east.

In Knox County, J. Roy Dee 2 G. & E. Steckler, NW NW 23-1s-12w, is being cleaned out following a 20-qt. shot in the Benoist sand at 2,083-96 ft. Prior to the shot the well swabbed approximately 75 to 100 bbl. of oil daily. It is about ¾ mile north of nearest production in the Mt. Carmel East pool of Gibson County, and may open a large new area in the northeastern part of this pool for development.

Indiana completions showed a decided upward trend during the past week as operators finaled eight oil wells and four dry holes, two of the latter being wildcats. Nine new operations were announced during the week and were located four in Gibson County, three in Posey and two in Sullivan.

INDIANA WILDCAT FAILURES

Greene County: Cap Smith 1 John W. Fuller, SW NE SE 23-8n-4w, dry at 2,440 ft., elev. 670 ft., Chattanooga 1,216 ft., Devonian 1,307 ft., Trenton 2,298 ft.

Posey County: National Associated Petroleum Co. 1 W. Walls, SW NW SE 34-5s-14w, dry at 3,139 ft., Glen Dean 2,434 ft., Hardinsburg 2,504 ft., Cypress 2,701 ft., Ste. Genevieve 2,934 ft., McClosky 3,028 ft.

ROCKY MOUNTAIN

Continental Gets Discovery On Circle Ridge Dome

DENVER.—A discovery in the Madison lime, a deeper pay, on the Circle Ridge dome, Fremont County, Wyoming, was chalked up in Continental Oil Co. 4 Shoshone-7607, SE SW NW 6-6n-2w. It had the top of the Madison at 1,290 ft. with a slight show of oil. It ran into a fault at 1,975 ft. and reentered the Madison at 2,045 ft., continuing to a total depth of 2,869 ft., drilling formation practically duplicating that above the fault. It was plugged back to shut off bottom water and cemented the 7-in. at 2,538 ft. Progressive testing from the bottom up through perforations showed water to 1,665 ft. when oil began coming in. After squeezing off the lower perforations, it swabbed 5 bbl. per hour at 1,600-65 ft., and it is estimated at 200 bbl. per day on the pump. The oil is 23.8° gravity.

Circle Ridge is a small, sharply dipping dome on the Maverick Springs anticline northwest of the Maverick Springs field. A discovery in the Tensleep at 592-655 ft was made in 1923, the well producing 132 bbl. of 24°-gravity black oil daily. The well then was shut in for 19 years until 1942 when Continental took over the operation and resumed drilling, completing 2 Shoshone-309 in the Tensleep at 590-610 ft. for 500 bbl. per day. This well is in the center of the 40 acres offsetting on the northwest the Madison discovery. Two locations to the west the formation was found to be practically on edge, and the hole was abandoned. After drilling several Embar-Tensleep wells on a north-south trend, it started a test in 1945 to the Madison, but completed it in the Tensleep on account of a crooked hole in the steep dips. Three other attempts to reach the Madison followed, the last one being the first to explore that horizon. The surface elevation is 7,150 ft. The top of the Amsden was at 1,080 ft.

Wildcats have shows.—Several widely scattered wildcats are at interesting depths with shows of oil and gas. Kerr-McGee-Phillips 1 Unit, C SE SE 10-12n-92w, Baggs District, Carbon County, Wyoming, drilling below 3,000 ft., has had several good shows of gas and one or two shows of oil. One drill-stem test at 2,982-3,000 ft. had an immediate blow of gas followed by a moderate flow with some water, tool open 1 hour and test through a 5/16-in. choke. A 15-ft. sand was topped at 3,323 ft. with a show of oil. All of the shows have been in the Tertiary and are encouraging, although lenticular sands make final results speculative. Practically the entire Tertiary section, estimated at 4,000 ft. thick, is being cored down to the top of the Mesa Verde. Sands in the Cretaceous down to around 7,000 ft. are the principal objectives.

Sinclair-Wyoming Oil Co. 1 Unit, NE NW 35-39n-91w, Lysite district, Fremont County, Wyoming, which had a flow of gas at the rate of 7,500,000 cu. ft. per day in a drill-stem test at 9,652-93 ft., made another test at 10,299-10,366 ft., open 35 minutes, and had a recovery of gas at the rate of 8,621,000 cu. ft. per day. It is drilling ahead at 10,370 ft.

Carter Oil Co. 1 Davis, NW NW 33-4s-20e, West Vernal structure, Uintah County, Utah, topped a gas sand at 5,856 ft., and is drilling at 5,857 ft. and preparing to make a drill-stem test with packer at 5,852 ft. It previously had cored saturation at 4,415-22 ft., but on a drill-stem test recovered water. The upper Jurassic at around 6,000 ft. is one of its first objectives.

Sand Draw Oil Co. 1-T South Sand Draw Unit, Fremont County, Wyoming, which started as a test to the Tensleep, topped the Frontier formation at 3,755 ft., and the first Frontier sand at 3,970 ft. and recovered gas in a drill-stem test. It is coring at 4,492 ft. in the Frontier, and will run casing and test. A discovery in this horizon will extend the upper gas sand a mile to the south. It is 2¼ miles south of the Tensleep oil discovery.

General Petroleum Corp. 45-25-G Unit, NE SW 25-27n-94w, Antelope Plain structure, Fremont County, Wyoming, had the top of the Frontier at 8,790 ft. Cores from 9,052-78 ft. showed sand and shale with gas bubbles and distillates. Drill-stem test at 9,053-78 ft. failed when packer didn't hold, but some gas-cut mud and a show of oil were recovered.

British-American Oil Producing Co. 6-E Tribal, NE NW 5-3n-1w, Steamboat Butte, Fremont County, Wyoming, a test to the Madison, topped the Amsden at 7,233 ft. and the Madison at 7,368 ft., total depth 8,000 ft. Casing was perforated at 7,378-7,408 ft. with 90 shots, hole then was acidized, and cleaned itself with noninflammable gas, estimated at 3,000,000 cu. ft. Water was encountered in lower part of the Madison. A squeeze job is being run. This field has production in the Frontier, Lakota, Sundance, and Tensleep.

Rangely field.—Allowable per well per day which was reduced November 1 from 175 to 150 bbl., has been raised to 165 bbl., the change being retroactive to November 1.

Rangely proven area is being extended a mile to the east in Stanolind Oil & Gas Co. 2 Coltharp, SE SW 36-2n-102w, a near completion. It topped the Weber at 5,816 ft., and saturation at 5,830 ft. Drilling stopped at 5,837 ft. to set the 7-in. on top of saturated zone at 5,830 ft. with 900 sacks. Top of Weber was at —602 ft., sea-level datum. This is a dip of 175 ft. compared with 1 Coltharp, a mile to the west.

Reserve Drilling Co. (Williams Brothers) and others 1 Stewart, C SE SE 25-3n-104w, for which location was released last May, has erected standard rig and is preparing to drill with cable tools to around 2,000 ft., and then change over to rotary. It is 5 miles northwest of the nearest producer, and will throw light on the territory west of the present limits of the structure as mapped by the U. S. Geological Survey, regarding which little is known, some claiming it is separated from the field proper by a large fault.

John Brorphy 1 Princeton & Terrell, C NE SE 33-2n-101w, for which location was released last April, is reported moving in rig from Texas. It is 3 miles east of Stanolind's 2 Coltharp now being completed as a producer and the outpost in that direction.

New operations.—Eleven new operations were reported, one in the Rangely field in Colorado; two in Big Sand Draw and one each in Big Muddy, Little Buck Creek, Garland, Lost Soldier, and Oregon Basin, in Wyoming; and one each in Bowdoin, Cat Creek, and Kicking Horse, in Montana. All are development wells. Two of noteworthy interest are Sinclair-Wyoming Oil Co. 4 Unit and 5 Unit in Big Sand Draw. Three Tensleep sand wells drilled in that field were offsets. The new locations are ½ mile to the north and west and south and east of the nearest producers.

Completions.—Twenty wells were completed, of which 13 were oil wells with initial production of 1,894 bbl., 3 were gas wells, and 4 were dry holes. Colorado had three completions for 879 bbl., all in the Rangely field. Six wells were completed in Wyoming, of which five were oil wells for 811 bbl., and one was a dry hole. The producers were one each in Circle Ridge, Horse Creek, Frannie, Oregon Basin, and Hamilton. The dry hole was a wildcat in Weston County. Montana had 11 completions, of which 5 were oil wells for 204 bbl., 3 were gas wells, and 3 were dry holes.

One of the Wyoming completions was General Petroleum 32 Government, NE NW 32-17n-68w, Horse Creek, Laramie County. It was dry in the Lakota at 5,383 ft. in 1943. The operator went back into it to test the Muddy, which was inadequately tested when drilling. It pumped 35 bbl. per day from the sand at 5,173-5,210 ft., after cleaning out and acidizing.

SUCCESSFUL WYOMING WILDCAT

Circle Ridge, Fremont County: Continental Oil Co. 4 Shoshone-7607, SE SW NW 6-6n-2w, TD 2,864 ft., plugged back and completed in Madison through perf. at 1,600-65 ft., swabbed 5 bbl. per hour, est. at 200 bbl. per day. Top of Madison 1,290 ft., top of Madison after drilling through fault, 2,045 ft.

WYOMING WILDCAT FAILURE

Sheep Creek, Weston County: Mule Creek Oil Co. 1 Gov't., C NW NW 14-42n-62w, TD 3,945 ft., dry, Dakota 3,860 ft., Lakota 3,941 ft.

MONTANA WILDCAT FAILURE

Shawmut, Golden Valley County: Mon-O-Co. Oil Co. 1 Unit, NW NE NW 19-7n-19e, TD 4,941 ft., dry, Dakota 2,297 ft., Ellis 2,896 ft., Amsden 3,097 ft., Madison 4,560 ft.

State Sales Tax Held Invalid on Exported Oil

WASHINGTON.—The California retail-sales tax may not be collected on oil sold for export, the U. S. Supreme Court has decided in reversing the California Supreme Court.

Richfield Oil Corp. contracted to sell oil to the New Zealand Government and delivered it into a British Navy tanker at Richfield's docks without paying the sales tax. The state contended this was not a sale for export. The Supreme Court, however, ruled that in such instances the tax violated the constitutional prohibition against export taxes even though there was no discrimination between export and local business, thus distinguishing export business from sales in interstate commerce as regards application of state sales taxes. It is understood a great many similar refund claims against California have been awaiting decision in this case.

PENBERTHY
"REFLEX"
WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

A FAIR QUESTION
for many a management man

SEE PAGE 30

Among the Drilling Contractors

Noble Drilling Co. was rigging up on the California Co. 1 Frances Brown, in NWC 9-7n-7e, in the Brookhaven field, Lincoln County, Mississippi.

Max Spidel has been awarded drilling contract on the Raymond Donnersberger A-1 Nick Krulac, in SE NE NE 8-3n-11w, Allegan County, Michigan.

G. W. Garner, Casey, Ill., has the drilling contract on the E. P. Jarvis 1 John Hartman, in NW SE 27-6s-12w, Posey County, Indiana.

Patrick Drilling Co. was rigging up on the Maner Graham 1 John A. Packwood, in NE NW 23-3n-11e, Walthall County, Mississippi.

Andrew S. Hoyt will drill on contract the Louis Zeelman 1 S. and B. Bowen, in NE NE SW 6-3n-10w, Barry County, Michigan.

E. F. Moran, Tulsa, has been awarded drilling contract on the Continental Oil Co. 4 C. H. Kleiderer, in SE NW 26-3s-14w, Gibson County, Indiana.

R. & S. Drilling Co. will drill three tests for Sohio Petroleum Co. in Isabella County, Michigan. These are the Coldwater Gas Unit 6, 14, and 16, in Sections 29, 32, and 35-16n-6w.

Bennett & Roberts Drilling Co. have staked location for a wildcat venture ½ mile north of Lorraine, Kans., in Ellsworth County. It is the 1 Debrinski, NW NW NE 16-17-9w, located on a 320-acre block 2 miles west of the Lorraine pool.

Penrod Drilling Co. is contractor on the Tide Water Associated Oil Co. 1 M. F. Higgins, in NE SE 15-6s-20e, Bradford County, Florida. Same contractor was moving in material to start the Sun Oil Co. 1 Earl Odon et al, in NE NE 31-5s-15e, Suwanee County, Florida.

Hayes Drilling Co., Mount Carmel, Ill., is contractor on the Ryan Oil Co. 9 Fannie Gibbs Putnam, in SW NW 26-1s-12w, Gibson County, Indiana.

Helmerich & Payne are scheduled to begin drilling operations this week at the Stanolind Oil & Gas Co. 1 Brenneke, SE SE SE 2-4-19w, wildcat test 5 miles south of the town of Stuttgart. The test is midway between the Dayton and Logan pools of Phillips County, Kansas, and is based on core-drill information.

Plains Production Co. is contractor for the Don Reese 1 T. E. Fouche, 22-12n-1w, Yazoo County, Mississippi. This test is located about 6 miles east of Yazoo City, and will be a 6,500-ft. wildcat venture.

Justrite Drilling Co., of Evansville, Ind., has been granted permit to drill the 1 Zella Day et al in NE SW 31-6s-11w, Vanderburgh County, Indiana. The 1 Day is a Heusler field test and is scheduled to go to 2,550 ft. Justrite has also been awarded contract for a well to be drilled by United Oil Co., the 4 Stadler, SE NW 32-6s-11w, also a 2,550-ft. test in the Heusler pool.

Olson Drilling Co. et al have been forced to stop for a fishing job at a total depth of 3,605 ft. at their 1 Palen, NW SW SE 26-8-10w. This test is located 4½ miles east of Tipton, Kans., and is the only drilling well in Mitchell County.

Big Chief Drilling Co. has been awarded contract by Gulf Refining Co. and is moving in materials for the 1 H. P. Howard et al, 8-1n-16w, Lamar County, Mississippi. This is a Baxterville field test.

Ed McClellan, of Evansville, Ind., has been awarded contracts for three tests to be drilled by L. C. Blenderman in Spencer County, Indiana. The

TUBBS
EXTRA SUPERIOR MANILA
CORDAGE COMPANY

Watch for This Trademark

when you must replace rope now, ask your supplier for TUBBS—*always* reliable!

TUBBS CORDAGE COMPANY

Distributors
Allied Supply Co.
Bethlehem Supply Co.
Clark-Wall, Inc.
Hickey Pipe & Supply Co.
Petroleum Equipment Co.

TYPE "B" WORK BENCHES ARE DESIGNED ESPECIALLY FOR LIGHT RIGS

Here's an inexpensive, all-steel work bench that's "just right" for light drilling and workover rigs. There's lots of storage space in the four roller-mounted drawers and swing-out rag bin. A sturdy vise stand is mounted at a level with the work table. Steel pegs on the back apron permit tools to be hung where they are easily accessible. A central locking system prevents spilling contents during moving and the bench is skid-mounted for strength and easy handling.

SOLD THROUGH SUPPLY STORES EVERYWHERE

OWEN TOOL COMPANY

Route 9, Box 800-B Tele. V 2-4341

HOUSTON, TEXAS

IT DOES NOT MAKE AN ATOM OF DIFFERENCE HOW YOU COMPARE ROPES — THERE IS NO SUBSTITUTE FOR QUALITY.

Backed by 141 years of manufacturing experience, **FITLER ROPES** are known for their strength, durability, water-repellency and flexibility.

THE EDWIN H. FITLER CO.

PHILADELPHIA, PA.

Established 1804

tests are the 4 Frank Bays, SW SE NE 27-6s-5w, the 5 Frank Bays, SE SE NE 27-6s-5w, and the 6 Frank Bays, SE NW SE 27-6s-5w, and are all located in the Grandview field.

Gutowsky Bros. Drilling Co. is drilling a venture just east of the one-well Lone Star pool in Oklahoma County, Oklahoma. It is the 1 Martin, SW NE 20-13n-2w, located several miles southeast of Edmond on a block of approximately 1,200 acres held by the Gutowsky interests.

Hewgley Drilling Co. has completed roads and is ready to move in materials for the 1 J. W. Campbell, SE SW 8-11s-28e, Flagler County, Florida. This well is contracted by Humble Oil & Refining Co. and is a wildcat test 10 miles southeast of Palatka.

Crow Drilling Co. was waiting on rig to start the Gulf Refining Co. 2 C. V. Cooper, in SW NW 17-1n-16w, in the Baxterville field, Lamar County, Mississippi. In the same field, **Crawford Drilling Co.** was rigging up on the Gulf Refining Co. 1 Howard-Holston Unit, in NW SW 17-1n-16w.

H. H. & B. Drilling Co. has given the Schoenchen pool of Ellis County, Kansas, its third producer with the completion of the 1 Pevonka, NE NW SW 22-15-18w. The well was completed in the Arbuckle lime for a potential of 559 bbl. of oil daily.

Texola Drilling Co. has started drilling operations at a Booch sand test, the 1 Rogers, NE NE NE 8-7n-9e, south outpost in the new East Holdenville pool in Hughes County, Oklahoma. Upon completion of the 1 Rogers, Texola will drill a twin in the Calvin zone.

CALENDAR

December

American Society of Mechanical Engineers, New York, December 2-6.

New Mexico Oil and Gas Association, annual membership meeting, Artesia, N. M., December 4.

California Natural Gasoline Association, Los Angeles, December 5.

Houston Nomads, Old College Inn, Houston, December 9.

Interstate Oil Compact Commission, winter quarterly meeting, Dallas, December 9-11.

Petroleum division, National Association of Credit Men, annual conference, Congress Hotel, Chicago, December 9-11.

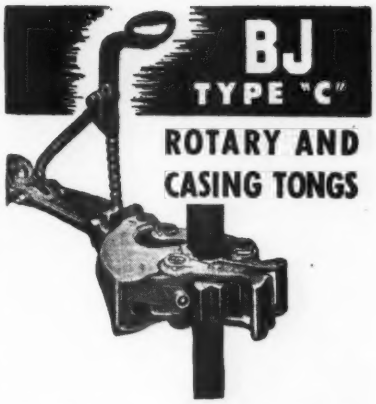
Oil Dealers Association of Arkansas, Hotel Marion, Little Rock, December 10.

Los Angeles Nomads, Mayfair Hotel, December 11.

American Chemical Society, meeting of Texas sections, Dallas, December 12-13.

Mid-Continent Oil and Gas Association, annual ad valorem tax forum, Plaza Hotel, San Antonio, Tex., December 16-18.

American Institute of Mining and Metallurgical Engineers, technical meeting sponsored by the five Texas sections, University of Texas, Austin, December 18-19.



Designed for portable drilling rigs, workovers and for handling small sizes of drill pipe on the largest rigs, this tong has proven most popular and successful. All diameters from 2⅜" to 8⅝" are perfectly gripped by using proper size latch lug jaws. Tong can be equipped with either short or standard levers, dependent on derrick conditions. Hinge pin holes are flame hardened to insure long trouble-free life. This tong, like the BJ type "B," is designed to meet unusually tough service conditions.

BYRON JACKSON CO.

Houston • LOS ANGELES • New York

PROVED IN OIL FIELDS AND REFINERIES

'BESTOLIFE Lead Seal Joint Compound has been used successfully in the Oil and Refining industries for the past fifteen years. During that time, it has proved itself superior in protecting threads and in providing tight joints which can be broken easily.

Ample stocks of 'BESTOLIFE available at supply house field stores in every drilling district in the United States and Canada. Use 'BESTOLIFE Tool Joint Compounds for best results!

EXPORT: THE NATIONAL SUPPLY CORP., 30 ROCKEFELLER PLAZA, NEW YORK

I. H. GRANCELL

1601 EAST NADEAU STREET

LOS ANGELES 1, CALIFORNIA

PERSONALS

Perlitz Becomes One Of Yougest U. S. Oil Executives

ONE of the youngest senior executives of a major oil company in the United States is Charles A. Perlitz, 43.

Election of Perlitz, Houston oil man and attorney, as executive vice president of Continental Oil Co. in a board meeting in New York City was announced last week in Ponca City by President Dan Moran.

One of Houston's civic leaders, Perlitz is a director and member of the executive committee of the Second National Bank of Houston, as well as a director in several other Houston business organizations.

He was the first president of the Junior Chamber of Commerce, in 1930, and at the same time served as a director of the senior Chamber of Commerce. He served 3 years on the Red Cross board of directors, a year on the community chest directorate and was president of River Oaks Country Club in 1939.

He joined Continental as general attorney in Houston January 1, 1946. For the previous 7 years he had been associated with Strake Petroleum, Inc., Houston independent producing company, and before that was a member of the law firm of Fulbright, Crocker & Freeman.

He received his A.B. degree from Georgetown University, Washington, D. C., in 1925 and his L.L.B. from Harvard in 1929.

C. V. Millikan, chief production engineer for Amerada Petroleum Corp., Tulsa, and **John R. Suman,** vice president of Standard Oil Co. (N. J.), New York City, were two of the six directors elected for the coming year by the American Institute of Mining and Metallurgical Engineers.

John J. Rupnik, formerly with Sun Oil Co. in Beaumont, Tex., is now associated with Sinclair Prairie Oil Co., in Tulsa as a geophysicist.

Kenneth Lyons, American Republics Corp., has succeeded **G. W. Burdick,** Ohio Oil Co., as president of the Shreveport Oil Scouts Association. Other officers are **Sam N. Jackson,** Sun Oil Co., vice president, and **Ogden Harris,** Phillips Petroleum Co., secretary-treasurer.

Charles E. Mills, drilling contractor and oil operator in the Lloydminster (Alberta) field, has been named by the Lloydminster Petroleum Association as its representative on the directorate of the Alberta Petroleum Association.

M. A. Wright has been named special assistant to the coordinator of producing activities for Standard Oil Co. (N. J.) to replace **Thomas Brownfield,** recently transferred to Tulsa as assistant to Carter Oil Co.'s President **Oscar Schorp. R. P. Walters** replaces Wright in New York.

Mose Clark, district geologist for Stanolind Oil & Gas Co. in Amarillo, has been transferred to Tyler, Tex. He is succeeded at Amarillo by **R. W. Mallory,** from the company offices in Casper, Wyo.

Floyd S. Bryant, vice president and director of Standard Oil Co. of California, has been in Washington in connection with the Elk Hills hearing.

R. V. Whetzel, foreign division manager of Cities Service Co. and a director of Companias Unidas de Petroleo (Tri-Pet Corp.) is now in Colombia and will visit Panama before his return to the United States. Whetzel is also a director of the recently organized Panama Oil Corp., which is owned by Venezuelan Petroleum Co. (Sinclair) and Cities Service.

E. L. Dalemont, director, and **J. de Courlon,** assistant director, of G. A. C. (French Petroleum Industry Buying Agency), of New York City, and **A. Martin,** in charge of the technical department of Direction des Carburants, Paris, have been visiting oil centers in the Southwest, following attendance at the annual meeting of the American Petroleum Institute.

Dr. Gustav Egloff, of Universal Oil Products Co., who recently visited China and the Scandinavian countries, will be guest speaker at three meetings in December. He will address the Milwaukee section, Society of Automotive Engineers, December 6; the South Bend, Ind., Chamber of Commerce December 9, and the Swedish Engineers Society of Chicago December 11.

Carl B. Mueller, construction engineer, has been transferred by Stanolind Oil & Gas Co. from Brownfield to Fort Worth. **Albert J. Junkel, Jr.,** field engineer, was transferred to Brownfield from the Panhandle area.

H. D. Grothusen has resigned as a member of the board of directors of Gas Advisers, Inc., New York, to join Stanolind Oil & Gas Co., Tulsa, as assistant superintendent of the gas and products sales section, manufacturing department.

L. D. M. Baxter was reelected president of Calgary & Edmonton Corp. at its recent annual meeting in Winnipeg, Man.

Henry Carter Rea, chief geologist for Bay Petroleum Corp., has resigned and opened a consulting office in Casper, Wyo., specializing in photogeology.

James S. Kaufman, formerly geologist with Wilcox Oil Co., has joined the geological department of Sinclair-Prairie Oil Co. in Tulsa.

Albert I. Ingham, with Shell Oil Co., Inc., the past 7 years, has become assistant geologist with the Pennsylvania Bureau of Topographic and Geological Survey.

John S. Taylor, district geologist in Midland, Tex., for Seaboard Oil Co. of Delaware, has been promoted to assistant to **Ray S. Stehr,** chief geologist in Dallas. **Lamar McLennan,** assistant district geologist, succeeds Taylor.

C. E. Beecher, general superintendent of production for Cities Service Oil Co., presented service awards to 23 employes of the company at a din-

ner held last week in Tulsa. **R. L. Kidd,** manager of the land and geological department, gave a talk.

Harold B. Miller, traffic division of Standard Oil Co. (N. J.), has returned to the United States after a 6-week trip to Aruba.

J. O. Dolan, secretary for the Creole manufacturing division of Standard Oil Co. (N. J.), has been transferred to Caracas where he will establish an office.

Prof. A. Irving Levorsen will head the new School of Mineral Sciences at Stanford University, combining what formerly were the departments of geology and mining. Levorsen formerly headed the geology department. A past president of the American Association of Petroleum Geologists, Levorsen previously was an independent research geologist in Tulsa.

Ivan B. Rollins, drilling supervisor for Standard-Vacuum Oil Co., in Sumatra, N.E.I., is slated to return shortly after being in the United States for several years.

E. L. Newman, Texas Pipe Line Co. superintendent in Wichita Falls, Tex., and **C. B. Williams,** production department manager, The Texas Co., presented awards to 36 employes with more than 25 years of service at a banquet in Wichita Falls November 23. **R. B. McLaughlin,** vice president and manager, Texas Pipe Line Co., was speaker.

J. K. Wright, Jr., has been appointed general manager of the newly organized Alec Crowell Co., petroleum consultants, Jackson, Miss. **Douglas Whitaker,** Shreveport, also is associated with the company.

Joe Beard, recently discharged from the U. S. Marine Corps, has accepted a position with Schweer & Hardison, consulting petroleum geologists, Wichita Falls, Tex.

M. L. Hambrick has been named district chief clerk in the production department of Humble Oil & Refining Co. at Geismar, La. Two production department transfers moved **O. A. Griffin,** district chief clerk, from Corpus Christi to Pleasanton, Tex., and **J. R. Goddard,** district chief clerk, from Pleasanton to Corpus Christi.

J. A. Clark, vice president of Creole Petroleum Corp., is slated to resign December 1 to become an executive assistant in the office of the coordinator of foreign and domestic production of Standard Oil Co. (N. J.) **R. H. Sherman.** Creole vice president and director, will take over Clark's duties as coordinator of Creole operations in New York. For the past 13 years Sherman has been in Venezuela directing Creole's geological activities. He has been with Creole and other Jersey Standard companies for more than 18 years. Clark has 23 years of similar service.

Chester L. May, vice president in charge of distribution properties, Lone Star Gas Co., was elected president of the Texas Manufacturers Association at the annual meeting last week in Dallas.

Lloyd A. Summers, in charge of the La Salina production district of Creole Petroleum Corp. with headquarters in Maracaibo, is spending a vacation period in Tulsa and other points.

Ross Floyd, one of the founders of Future Farmers of America, has been appointed agricultural service manager for Continental Oil Co. to direct from Ponca City, Okla., farm-service activities in all 44 states in which Continental operates. He formerly served with the war finance division, U. S. Treasury Department, and for 8 years prior to that was associated with the U. S. Soil Conservation Service.

Paul H. Williams, of Shell Development Co., is chairman of the exposition committee of the California section of the American Chemical Society. Other committee members planning the event, scheduled for October 21-25, 1947 in San Francisco, include **J. E. Hedrick,** Shell Chemical Corp., and **B. P. Geyer** and **Fred D. Tuemmler,** both of Shell Development Co.

Warren C. Wilson, head of the operations analysis department in Standard Oil Co. of New Jersey's Bayway refinery, has been named process coordinator of the New Jersey Works. Succeeding him in the analysis department is **Richard W. Tryon.** In three other Bayway changes, **Clifford E. Gustafson** was appointed assistant to the head of the chemical-products laboratory; **W. Selby Harney, Jr.,** was made assistant head of the main laboratory; and **William M. Drout, Jr.,** was placed in charge of the distillation group in the chemical-products laboratory.

D. Comins, in charge of petroleum engineering and reservoir control for Anglo-Iranian Oil Co., Ltd., and **R. K. Dickie,** in charge of technical field operations for the company in the United Kingdom, attended the recent annual A.P.I. meeting in Chicago and now are visiting operating centers in the Southwest. Both are from the London offices of the company.

B. R. Dunn, Tyler, Tex., oil-title specialist, early this week was in Washington to negotiate for the purchase of the strike-bound, 36-mile Missouri & Arkansas Railroad line from Joplin, Mo., to Helena, Ark., for which he is reported to have offered $800,000.

Shifts

Louis M. Ayers, foreman, Magnolia Petroleum Co., Eunice, N. M., to Corpus Christi; **John Wm. Walker,** engineer, Shell Oil Co., Inc., Quitman, Tex., to Houston; **Kermit V. Stephenson,** foreman, Amerada Petroleum Corp., Seminole, Tex., to Eunice, N. M.; **Bert Trimm,** engineer, Magnolia Petroleum Co., Trinity, Tex., to Lake Charles, La.; **Rex M. Smith,** geologist, Humble Oil & Refining Co., Beaumont to Houston.

Rex H. White, foreman, Magnolia Petroleum Co., Dallas to Garland, Tex.; **Lawrence W. Coldren,** superintendent, Pure Oil Co., Fort Worth, to Mineola, Tex.; **O. J. Jantz,** foreman, Amerada Petroleum Corp., Alexandria, La., to Houma, La.; **Bert Aiguier,** superintendent Danciger Oil & Refining Co., Amite, La., to Natchez, Miss.; **A. L. Jenkins,** superintendent Sun Oil Co., New Iberia, La., to Delhi, La.

Franklin E. Eck, engineer, Carter Oil Co., Carmi, Ill., to St. Elmo, Ill.; **E. L. McManus,** engineer, Shell Oil Co., Inc., Woodriver, Ill., to Anaheim, Calif.; **N. J. McManus,** engineer, Shell Oil Co., Inc., Alma, Mich., to Arkansas City, Kans.; **James W. Wilkerson,** superintendent, Sinclair-Wyoming Oil Co., Yazoo City, Miss., to Bairoid, Wyo.; **C. Clyde Ritchey,** superintendent, American Drilling Co., Asbury Park, N. J., to Belmar, N. J.

E. R. Woolfolk, geologist, Stanolind Oil & Gas Co., Trinidad, Colo., to Durango, Colo.; **Lester Johnson,** foreman, Sinclair Refining Co., Mission, Kans., to Hammond, Ind.; **R. N. Harding,** foreman, The Texas Co., Havre, Mont., to Cody, Wyo.; **John A. Schwaig,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to Kansas City, Kans.; **E. C. Smith,** engineer, Associated Refining, Inc., Duncan, Okla., to Cement, Okla.

John H. N. Evinger, engineer, Gulf Oil Corp., Tulsa to Grove, Okla.; **E. A. Jenkins,** engineer, Skelly Oil Co., Tulsa, to Velma, Okla.; **John W. Tyman,** engineer, Phillips Petroleum Co., Oklahoma City, to Kaw, Okla.; **Will S. Sease,** superintendent, Engineering Laboratories, Inc., Tulsa, to Garland, Tex.

Equipment Men in the News

Black, Sivalls & Bryson In Power Exposition

C. E. HUFF

C. E. "Bert" Huff, general sales manager of special products division, Black, Sivalls & Bryson, Inc., will head the company's attraction at the seventeenth National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York, December 2 to 7. Jim Myers, assistant sales manager; T. S. Murphy, New York district manager; E. V. White, Ohio representative; and Horace Lemmer, representative for eastern Canada, will be in attendance at Booth 564 to conduct the demonstrations and answer questions.

Thomas Secretary and Treasurer of American Iron & Machine Works

V. L. Thomas has been appointed secretary and treasurer and a member of the board of directors of American Iron & Machine Works Co., it is announced by J. A. Gray, president. Thomas joined the firm in 1937 and has been successively office manager, controller, and assistant secretary until the recent change.

Marketing Service for New Inventions

A marketing service for new inventions is announced by National Merchandisers, according to E. Millard Smith, executive director. Purpose of the division will be to help the average inventor at every step until the invention is on the market. Activity will also be centered around engineering analyses, market surveys, and invention sales.

Mathieu and Stoll in Colombia for Schlumberger

J. L. Mathieu, Houston office of the Schlumberger Well Surveying Corp., and J. A. Stoll, from the Caracas office, are on a business trip in Colombia.

Renner Sales Manager For Wickwire Spencer

L. J. Renner has been appointed Mid-Continent wire-rope sales manager for the Wickwire Spencer Steel Division of Colorado Fuel & Iron Corp. Renner will be located at 1502 Fort Worth National Bank Building, Fort Worth. He previously handled the sale of wire rope in the Chicago district office.

New Officers for Steele Advertising

John Paul Goodwin has been elected president of Steele Advertising Agency. Goodwin has served in an executive capacity in advertising agencies for the past 18 years, both in the Southwest and the East. Other new officers of the agency include Samuel H. Peak, vice president, and Wallace W. Brown, secretary-treasurer. Tom E. Daley has been named production manager and James M. Sanders radio director.

Rampp in Charge of Ideco Eastern Oil-Field Sales

Appointment of Martin J. Rampp as manager, oil-field sales, eastern division of International Derrick & Equipment Co., is announced by O. M. Havekotte, president. Rampp will maintain his headquarters at Marietta, Ohio, where he will continue to manage the Marietta plant in addition to his new duties.

Gaertner Elected Controller Of Goodrich

H. V. GAERTNER

Herman V. Gaertner, assistant treasurer of the B. F. Goodrich Co., has been elected controller of the company following the retirement of T. B. Tomkinson scheduled for December 31, 1946. Gaertner, who was appointed assistant controller in 1929 and assistant treasurer in 1943, joined the company in 1916 as a clerk in the company's accounting division. In 1925 he was placed in charge of the company's traveling auditors and named budget supervisor. The following year he became assistant auditor, moving to the position of assistant controller 3 years later.

Povlsen Appointed Assistant to President of Galvin Manufacturing

P. V. Galvin has announced the appointment of Paul K. Povlsen to the position of assistant to the president of Galvin Manufacturing Corp., Chicago. Povlsen was formerly vice president in charge of production and engineering for J. I. Case Co., Racine, Wis.

Bonney Forge & Tool Works Appoints Otterson Sales Manager

C. D. OTTERSON

Appointment of Charles D. Otterson as sales manager of Bonney Forge & Tool Works, Allentown, Pa., is announced by F. S. Durnam, president. Otterson brings to this company a wealth of experience in many varied fields of sales and other activities.

Parsons Speaks to Tulsa Nomads

Claude P. Parsons, vice president of Hughes Tool Co., Houston, was the principal speaker at a meeting of the Tulsa Nomads, November 20. Parsons discussed his recent visit to the oil fields of the Middle East and to European points. He also presented a movie showing interesting parts of his trip.

Patterson-Ballagh Sales Transfers Announced

A. L. GOODEN

A. L. "Preach" Gooden, formerly at Alice, Tex., has been transferred to Rangely, Colo., by Patterson-Ballagh division of Byron Jackson Co., where he will handle sales and service of their oil-field rubber specialties. He will not cover the Casper area, since J. H. Buchanan will handle the line in that territory. J. M. "Jimmie" Newton, who joined the division in July 1944, has recently returned from a trip to the California plant to familiarize himself with

J. M. NEWTON

W. B. GARDNER

new equipment and methods of manufacture. Newton is now stationed at Baton Rouge, and covers the fields in Mississippi and the Harvey, La., district. He was formerly employed by Hunt Tool Co., Jennings, La. Wiley B. Gardner is now living in Mooringsport, La. He has represented Patterson-Ballagh since 1937 and has

C. J. McKERNAN

H. H. COLLINS

just completed a trip to the factory in Los Angeles where he studied new plant methods and equipment. From Mooringsport he covers sales and service in northern Louisiana, Arkansas, and East Texas. C. J. "Chili" McKernan is stationed at Odessa, Tex., where he will be factory representative in the West Texas, Panhandle, and New Mexico area. Previously he worked for Wilson Supply Co. in southern Louisiana. H. H. "Bud" Collins is now sales and service representative in Southwest Texas where he has taken over the territory formerly served by Gooden. Collins will establish headquarters in Alice, Tex.

Borg-Warner Purchases Superior Mill

Borg-Warner Corp. announces that it has purchased the physical assets of the Superior Sheet Steel Co. of Canton, Ohio, to provide an additional source of sheet steel to increase production in current housing emergency. Transfer of ownership will be effective December 2. The Superior mill after the transfer will continue under its present management as a division of Borg-Warner.